

# SD Times

SOFTWARE DEVELOPMENT

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## WIND RIVER ACQUIRES BSD UNIX

Open-source operating system to crown end-to-end strategy; FreeBSD will carry on

BY EDWARD J. CORREIA

Perhaps it was blind luck that drove Berkeley Software Design Inc. to seek advice from Wind River Systems Inc. on how to help their respective operating systems interact. Wind River just happened to be in the market for an open-source operating system to buy. The call

resulted in the sale of all of BSDi's software assets to Wind River, including BSD/OS, its commercial version of Unix, which will crown Wind River's high-end embedded strategy. The remaining portions of BSDi will shift their business



Unix is important in embedded systems, says Wind River's Fiddler.

to selling only hardware under the name iXsystems Inc.

According to Jerry Fiddler, Wind River's chairman and founder, Unix represents an important cog in today's embedded systems, where he said an ever-increasing complexity continues to blur the lines between what is embedded and what is

not. "So many of the tough problems, like communications issues, security problems and device management, are not in the infrastructure, or the clients, or the servers—they span those things," he said. "What we can

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## Borland Preps Delphi 6.0 For Release

Native XML, SOAP support for Web services to augment Linux portability

BY EDWARD J. CORREIA

Borland Software Corp. is getting ready to release Delphi 6.0 for Windows, the company's radically enhanced RAD environment for building enterprise applications and database and server middleware.

According to Michael Swindell, Borland's director of product management for RAD tools, Delphi 6.0 will introduce a series of new features for the creation of Web services for Microsoft .NET, Oracle .NOW and Sun One; to further extend its database middleware capabilities; and fulfill its pledge of portability between Linux and Windows applications—a promise it made in March with the release of the Kylix RAD environment for Linux.

New to Delphi will be BizSnap, a Web services platform designed for building B-to-B integration components. The new Delphi compiler will feature native XML and SOAP capabilities, said Swindell, who describes BizSnap as more than just another set of components. "This isn't just a set of classes that we've bolted on. We've gone down into the compiler and made the capabilities native to Delphi," he said.



Web services can be created in Delphi, says Borland's Swindell.

Swindell claims that having XML and SOAP capabilities native to the compiler makes building and using Web services an effortless process. It also enables features such as syntax checking, data-type checking, and static and

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## Curl Adds Muscle to the Web

Surge suite makes Internet executable from client

BY DAVID RUBINSTEIN

The key to a rich, robust Internet experience, according to the engineers at Curl Corp., is compiled code, not interpreted code. Curl has released Surge 1.0, a software runtime environment that it says provides users with rich graphics, faster rapid response times and a reduction in the size of content to accelerate downloads.

Curl content is delivered over the Internet in source-code form, said Bob Batty, Curl's vice president of sales and marketing, much like HTML. The differ-

ence is that where Flash or Java is compiled to some intermediate stage, Curl is compiled at a client-side plug-in, creating in effect an "executable Internet"—a term coined by Forrester Research analyst George Colony and brought to fruition by Curl, Batty explained.

For developers, Batty said

that Curl is not only a scripting environment, but a full object-oriented programming environment, with the Surge runtime and Surge Lab IDE based on the Curl Content Language, which unites scripting, markup and graphics into one environment. "To use Curl in an object-

► continued on page 38

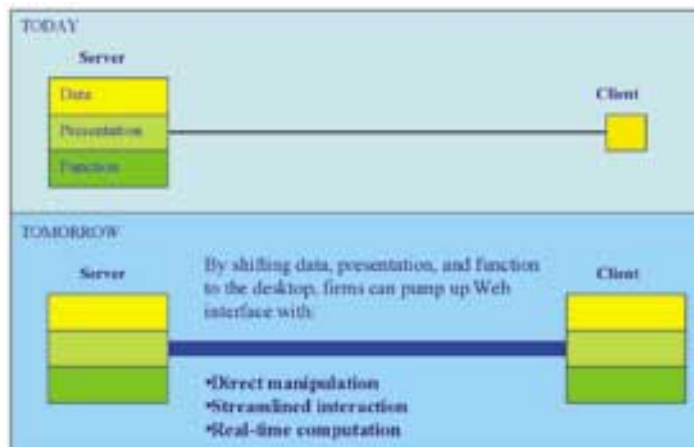
## COLDFUSION LOOKS TO THE FUTURE

BY DAVID RUBINSTEIN

In its first launch under Macromedia Inc. ownership, ColdFusion 5.0 hits the streets this week with new features for improved developer productivity and an eye toward the future, when the former Allaire product line is even more fully interwoven with Macromedia.

In ColdFusion 5.0, which has been enhanced to provide data analysis and dissemination, users no longer have to buy charting from third-party vendors, according to Phil Costa, senior product marketing manager at Macromedia. Built on Macromedia's Generator 2 graphics server, ColdFusion 5.0 generates predefined charts and allows for data to be hand-queried to them, he said. Sup-

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Curl is compiled on the client, creating an 'executable Internet.'

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# CA Places Jasmine ii Portal At Center of IT Infrastructure

BY DAVID RUBINSTEIN

With the release of its Jasmine ii 3.0 portal server, Computer Associates International Inc. is moving the technology squarely into the heart of IT infrastructure by providing integration of applications, information and data through a customizable portal interface.

"It's important to begin to allow technology to reflect the business process, instead of constantly having to change the business process to incorporate changes in technology," said John Ulery, CA's product

manager for the new portal server. "Integration and personalization have to be tied together. It can't be just documents. The portal needs to support the business process, with transactions, visualizations and the like."

The 3.0 portal, available now, was designed for ease of use for end users as well as administrators, claims Carl Hartman, CA's vice president of e-business management.

"It has to be easy or it won't succeed," he said. CA's portal technology allows end users to

define multiple workplaces because "everyone wears more than one hat" on the job, Hartman explained, and users can create as many workplaces as they need, bringing in only the tools specific to each of those tasks.

Within the workplace, he added, users can grab, drag and drop tools or components and size them according to how they want them. This is done through templates, which CA has added to the 3.0 portal. "These tools are end-user tools," Hartman said. "The idea



Customization provides the flexibility to create multiple workplaces.

is not to place extra burden on the IT staff, but to let end users empower themselves."

Portal administration is done in pure HTML, Hartman said, allowing management access inside or outside a firewall. Also, support for tradi-

tional and simplified Chinese and Korean languages has been added in an attempt to internationalize the portal. Jasmine ii Portal 3.0 sells for \$15,000 per server with unlimited users, and is available under a leasing model as well. ■

## Are Portals the Workspace of the Future?

BY EDWARD J. CORREIA

What is a portal? The answer may depend on whom you ask. Webster defines it as a doorway or entrance. To fans of the original "Star Trek" television series, the Portal was a gateway that Captain Kirk and crew walked through to find themselves transported to other times and places in the galaxy.

Ask a computer user to define portal and many might say Yahoo, not because they're happy, but because the pioneering Web site (or those like it) is on their daily hit list and might even be a hub of their daily activities.

And yet, as poorly defined as the term is, no fewer than five software vendors have announced portal products in recent weeks, apparently hoping to define a market for their wares.

To John Ulery, product manager of portal and business intelligence at Computer Associates International Inc., portal is an evolving term that has been used too liberally. "A year ago, if you had a good application that was Web enabled and had a good interface, it was called a good application. Today you call it a portal."

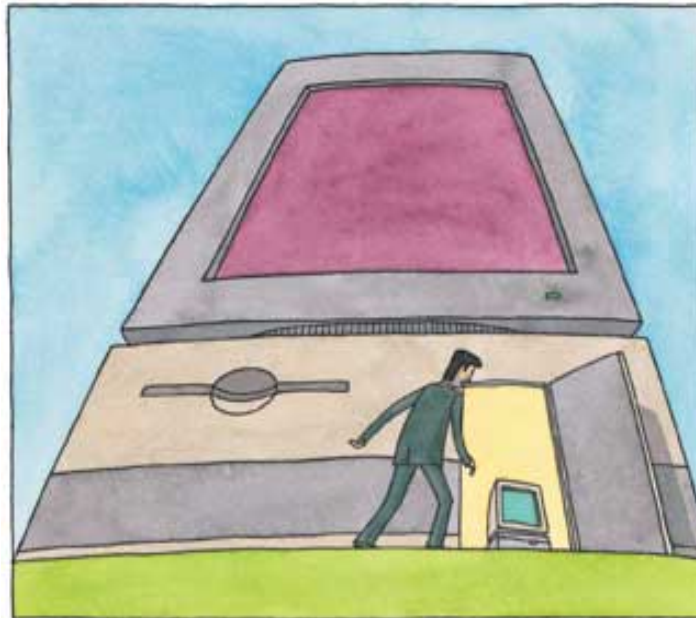
Carl Hartman, CA's vice president of e-business management, agrees, adding that

many overuse the term, which has caused it to lose its meaning. "That is the problem. Vendors have a tendency of taking a word or concept and making it what they want. So the term has become rather fuzzy in terms of what it really means. Technically, a portal is an opening, and CA sees it as an opening to knowledge."

CA's recently released Jasmine ii Portal 3.0, according to Hartman, gives users the ability to create a custom application launch pad and workspace, including mainframes and all of CA's back-end systems, using a drag-and-drop interface. "The idea is gathering the appropriate informa-

tion for a particular audience and delivering it to them in a personal fashion," he said. "We all have things we follow and want to be informed about—our stock ticker or sports teams or whatever—and that can be a component of the larger picture for business, with people controlling their own information feeds," of which Web sites like Yahoo can be a part.

"From our perspective," Ulery said, "a portal is not a Web site, but a Web-based service for integrating content. For instance, Yahoo allows you to connect to any public content, but in terms of content



that you need to support your business process, you may need to connect to mainframe or desktop applications or unstructured content."

Patrick O'Brien, vice president of product strategy at Iona Technologies Inc., believes that in the future, there will be no pure portal vendors. "I think it will be similar to the 4GL market, where there were once something like 20 vendors and now there are maybe four," he said. "Portals will get subsumed by application server vendors, and the idea of a stand-alone portal that doesn't link to a back end or app servers won't last." Iona's portal strategy is defined by the integration of business process, information and applica-

tions, and ties in back-end systems with deployment to multiple Web-enabled devices.

Ulery believes that the terminology will continue to evolve and adapt. "A portal will be known as the infrastructure component," and as a means to aggregate and deploy content, he said. "We see portals being ubiquitous across businesses within two years, and there won't be anything special about having a portal. And at that point, any application, new Web service or anything will be expected to be accessible via the portal. Indeed, it is the workplace of the future."

But Rick Lehrbaum, executive editor of LinuxDevices.com, an embedded Linux portal, thinks that CA's future

vision might be a stretch. "Certainly information organization and access is important, but to say it's 'the future' [of computing] is going a long way," he said. "I think an important part of the future of computing is to help us organize and manage all our information. And making sure all your data is sharable among all your devices is going to be very important so we don't have to carry around five different devices."

Lehrbaum, who founded the LinuxDevices.com portal that would later be acquired by ZDNet, said it originally began as a place that people could go to find out anything about embedded Linux, but turned into much more. "It has a lot of original content and isn't simply an entry point to other places."

Ulery said that CA's portal can reduce what he called the "go-to, look-for environment" that occupies much of a worker's time. "We lose weeks of time going to and looking for things that we need," he said, and to eliminate that would create a huge boost in productivity.

Hartman described how a CA portal might help development managers, who might be juggling a staff, their skills and tools, and multiple projects and deadlines. "A portal is a way to bring all that information together so they can see everything they need to support their business of creating applications." ■



The term 'portal' has become fuzzy, says CA's Hartman.



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# Microsoft Tweaks Visual Basic.NET

Developers want semantic changes reversed in beta 2

BY ALAN ZEICHICK

The results are in from Microsoft Corp.'s first beta of the new Visual Basic.NET, and according to Ari Bixhorn, its product manager, results were generally positive—but developers insisted on a few changes designed to make the language more compatible with early Visual Basic versions. "The enthusiasm was for VB.NET's new power features," said Bixhorn. "Developers wanted to access features available to C++ programmers, like direct access to the platform and real object-oriented features."

However, he added, developers gave a thumbs down to three of the changes that Microsoft made to the language specification itself—changes that might appear trivial to anyone not familiar with Visual Basic, but which could break existing code and make life difficult for programmers developing new code.

"They were excited that we provided a tool for moving from Visual Basic 6 to Visual Basic.NET," said Bixhorn, "but

they were worried about the 'knowledge upgrade.'" Trained programmers with years of experience on earlier versions of the language might be confused, he said. "They want to be able to look at a single line of Visual Basic code and not have to ask whether it was created by VB 6 or VB.NET." So, he said, these semantic changes will be reversed in the second beta of Visual Basic.NET, which he indicated will be released this summer.

The first change is that in Visual Basic 6 and earlier, the Boolean AND and OR operators performed both logical (true/false) operations and bitwise logical (multiple bit) operations. With VB.NET, said Bixhorn, Microsoft had redefined AND and OR to be exclusively for logical operators, and had created new BITAND and BITOR operators to handle bitwise logical operations.

The second modification is the removal of a change to the Boolean constant TRUE that had been modified from -1 to +1 in the first beta to be consis-

tent with other Microsoft languages, including Visual C++, he said. Programmers overwhelmingly preferred that this essential constant remain unchanged at -1.

Finally, the defaults for array definitions had changed. Previously in Visual Basic, dimensioning an array to a certain parameter indicated the highest element subscript number, said Bixhorn. For example, the statement DIM X(10) actually defined 11 elements ranging from X(0) to X(10); common programmer practice was to use the zeroth element in the array as an array index. For Visual Basic.NET, the dimension parameter's meaning had been altered to indicate the total number of elements in the array, and therefore DIM X(10) created only elements X(0) to X(9).

"We didn't break the language; we enhanced it," laughed Bixhorn, "and now we're enhancing it back." Bixhorn added that Visual Basic.NET should be released to manufacturing by the end of this year. ■

## Books and Computer-Based Training:

**Jolt Award:** "Adaptive Software Development," James A. Highsmith III

**Productivity Awards:** "Don't Make Me Think! A Common Sense Approach to Web Usability," Steve Krug; "Secrets and Lies," Bruce Schneier; "Writing Effective Use Cases," Alistair Cockburn

## Design and Management Tools:

**Jolt Award:** GDPro, Embarcadero Technologies Inc.

**Productivity Awards:** Together Control Center, TogetherSoft Corp.; WebSphere Studio, IBM Corp.; eSEWeb, Software Productivity Center Inc.

## Languages and Development Environments:

**Jolt Award:** JBuilder, Borland

**Software Corp.**

**Productivity Awards:** WebLogic Server, BEA Systems Inc.; WebGain Studio, WebGain Corp.; Zope, Digital Creations Inc.

## Libraries, Frameworks and Components:

**Jolt Award:** SoftWire, SoftWire

**Technology LLC**

**Productivity Awards:** Bold for Delphi, BoldSoft MDA AB; VisualSoft Crypt, VisualSoft Technologies Ltd.

## Utilities and Deployment Tools:

**Jolt Award:** VMware Workstation, VMware Inc.

**Productivity Awards:** XML, Altova Inc.; Jtest, ParaSoft Inc.; CodeRover Browser, Upspring Software Inc.

## Special/Other:

**Jolt Award:** Dreamweaver UltraDev, Macromedia Inc.

**Productivity Awards:** Flash, Macromedia Inc.; SQL Anywhere Studio, Sybase Inc.; EJB Specification 2.X, Sun Microsystems Inc.

At the ceremony, MicroEdge Inc.'s Visual Slick-Edit was inducted into the Software Development Hall of Fame, an honor reserved for a product that had won multiple Jolt and Productivity Awards.

# Jolting the Industry

Magazine panel honors year's best products

BY ALAN ZEICHICK

SAN JOSE, CALIF. — Carrying on a venerable tradition, CMP Media Inc.'s Software Development Magazine announced its 11th annual Jolt product awards at the Software Development Conference, held here in mid-April.

The Jolt Awards have been a part of the software development scene since the publication was named Computer Language. The awards, originally co-sponsored by the maker of the hypercaffeinated Jolt Cola, honor the best new tools introduced during the previous year with the Productivity Award, and provide special recognition to those products that had even greater impact on the entire industry with a special Jolt Award trophy—a soda can encased in clear plastic.

"For more than 10 years, Software Development Magazine has recognized the best

and most useful products each year with the Jolt Product Excellence and Productivity awards," said Roger Smith, technical editor of Software Development Magazine, in a statement. "For a book or tool to reach finalist status indicates just how valuable these products are in delivering high quality software development solutions."

The awards were nominated by both the judges and by the general public, and were narrowed down to a pool of 36 finalists by the judges, who included not only Software Development Magazine editor-in-chief Alexandra Weber Morales and technical editor Smith, but also industry consultants and journalists Scott Ambler, Andy Barnhart, Hugh Bawtree, Andrew Binstock, Dana Cline, Bob DeRossi, Stan Kelly-Bootle, Gary Evans, Warren Keuffel, Chris Minnick, Larry O'Brien, Roland Racko, Guy Scharf, Rick Wayne, Karl Wieggers and Alan Zeichick. ■



## News Briefs

### COMPANIES

A recent survey of more than 300 Linux developers shows 77.2 percent chose **Red Hat** Linux as the most likely distribution to use with a Web server. The study, done in January by the independent **Evans Data Corp.**, found **SuSE** Linux and **MandrakeSoft's** Linux-Mandrake to be the second choice, each with 21.8 percent. **Caldera** Open Linux garnered 21.4 percent, and **FreeBSD** 20.4 percent—the fact that **FreeBSD** isn't based on Linux notwithstanding. **Corel** Linux was last with 7.8 percent . . . The for-profit learning subsidiary of New York University, **NYUonline Inc.**, has released iAuthor, a standards-based course-authoring system that permits users to work in collaboration from different locations. It is said to be compliant with SCORM (Sharable Content Object Reference Model) standards developed by the U.S. Department of Defense. iAuthor is scalable and is designed for large, enterprisewide installations . . . **Informix Software**, a subsidiary of Informix Corp., and **BroadVision Inc.** have integrated BroadVision's One-To-One Enterprise 6.0 e-business platform with the Informix Dynamic Server . . . Embedded systems developer **Wind River Systems Inc.** has acquired the Virtuoso DSP



development tools and embedded RTOS

from **Eonics NV**. As part of the agreement, some of Eonics' employees will join Wind River and the Virtuoso name will be changed. Financial details were not disclosed . . . Embedded application development company **I-Logix Inc.** has completed a \$7.6 million round of equity funding, led by **Philips Ventures BV** and **Needham Capital Partners**. The total amount of funding I-Logix has secured over the past 16 months has grown to more than \$18 million . . . **Cysive Inc.** has announced a "restructuring" plan to reduce its work force by 30 percent in order to reduce costs and "ensure [Cysive's] long-term success," the company said in a statement. The plan is expected to save \$8 million to \$10 million yearly . . . **Be Inc.** will cut approximately 27 positions out of its sales, marketing



and general administration departments, the company announced. Additional engineering positions are also being eliminated because they were not "focused on the company's core product lines," the company said in a statement . . . According to a survey listing the top 10 corporate brands, **Microsoft Corp.** has finally come out on top as the most recognizable brand in America. The survey was compiled by **Corporate Branding LLC**, a global brand strategy company. For the past three years, Microsoft had been second to Coca-Cola as the most recognizable brand, in the survey of senior business decision-makers consisting of vice presidents and higher at the top 20 percent of U.S. corporations based on revenue. Coca-Cola and Disney rounded out the top three, and Procter & Gamble was the only company to slip out of the top 10.

### PRODUCTS

The Apache Software Foundation has announced the first public beta of the **Apache Web Server 2.0** with support for the lightweight process model "threads," which the foundation claims will improve scalability significantly. The release also includes support for the Ipv6 protocol. The beta has been successfully tested on BeOS, MacOS X, OS/2, Unix and Windows, the foundation said . . . The **Advanced Server/J** from Brokat Technologies Inc. has earned the J2EE-compatible brand from Sun Microsystems Inc., joining the growing number of companies that have committed to the Java technology . . . Kinook Software Inc.'s **Visual Build version 3.4c**, which acts as a graphical makefile utility for Microsoft's Visual Studio tools, now has features for setting project properties for Visual Basic and Visual C++ projects, updating references to a Visual Basic project within a project group, and support for multiple source files in a Visual C++ project . . . Iona Technologies Inc. is offering a **DeveloperCenter** at [www.iona.com/devcenter](http://www.iona.com/devcenter) that includes tools and tips for building applications using XML, J2EE, Web services and other technologies, as well as "Tech Zones" for CORBA, EAI, J2EE, mainframe integration, methodologies and XML . . . NTP Software is offering a new **System Sentinel Advanced Application Management Kit** for Citrix's MetaFrame platform. The management kit includes 18 performance counters and thresh-



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# Mac OS X

An Overview for Developers

**With Mac OS X, Apple asserts its leadership in the advanced technologies and design sensibilities that are the hallmarks of any great operating system.**



Mac OS X is a completely rebuilt implementation of the Macintosh operating system. It expands on Apple's technological strengths, such as industry-standard networking capabilities and industry-leading user interface design.

More importantly,

Mac OS X combines those strengths with support for a variety of technologies beyond those typically associated with the Macintosh, such as UNIX and Java 2 Standard Edition. This unique combination of technologies offers developers stability, power, and interoperability, beneath a well-designed, elegant, and intuitive user interface. As a result, Mac OS X presents new opportunities for both development and deployment.

## Darwin

The stability of Mac OS X begins with Darwin, the open source core of the system. Darwin integrates a number of technologies, including the Mach 3.0 kernel, operating system services based on BSD UNIX, high-performance networking facilities, and support for multiple integrated file systems. Further, Darwin's modular design lets developers dynamically load such things as device drivers, networking extensions, and new file systems.

### Apple and Open Source

Apple is the first major computer company to make open source development a key part of its ongoing software strategy. The core of Mac OS X, Darwin, is itself an open source project. This approach to operating system development allows developers and students to view the Darwin source code, learn from it, and submit suggestions and modifications. Developers can participate in the Darwin open source project by signing up at <http://www.opensource.apple.com>

Darwin's advanced memory protection and management system ensures reliability by allocating a unique address space for each application or process. The Mach kernel augments virtual memory semantics with the abstraction of memory objects. This enables Mac OS X to manage separate application environments simultaneously, while presenting users with a seamless experience.

Darwin also supplies the following advanced functionality:

- Preemptive and cooperative multitasking.
- Symmetric multiprocessing (SMP) augmented by support for multithreading.
- Real-time support guaranteeing low-latency access to processor resources for time-sensitive media applications.
- An object-oriented device driver programming framework called I/O Kit.

## Graphics System

Mac OS X combines three powerful graphics technologies, Quartz, OpenGL, and QuickTime, enabling developers to push graphics beyond anything users have seen on a desktop operating system.

### Quartz

Quartz is the foundation of the Mac OS X imaging model. It is comprised of a high-performance, lightweight window server and a graphics rendering library for two-dimensional (2D) shapes. The window server features such advanced capabilities as device-independent color and pixel depth, layered compositing, and buffered windows for the automatic repair of window damage.

The Quartz rendering model is based on the cross-platform Portable Document Format (PDF) standard, enabling developers to easily embed and manipulate PDF data within any Mac OS X application. This yields such benefits as automatic PDF generation and save-as-PDF, automatic onscreen preview of graphics, conversion of

PDF data to printer raster data or PostScript, and a consistent feature set for all printers.

The layered compositing engine used by Quartz allows developers to create unique onscreen effects. It replaces the "switch model" of traditional windowing systems with a "video mixer" model in which every pixel on the screen can be shared among windows in real time. This model allows for smooth transitions between the states of the graphical user interface.

Quartz also provides developers with these advantages:

- On the fly anti-aliasing of graphics and text enabled by the use of a floating-point coordinate system and high-precision vector processing.
- Direct access to the video frame buffer.
- Automatic detection of and benefit from the floating-point coprocessing performed by the Velocity Engine in PowerPC G4 microprocessors.

### OpenGL

For three-dimensional (3D) graphics, Mac OS X features an optimized implementation of industry-standard OpenGL. OpenGL is one of the most widely adopted graphics standards today, making code written to OpenGL extremely portable and making generated visual effects highly consistent. It is specifically designed for games, animation, CAD/CAM, medical imaging, and other applications that need a rich, robust framework for visualizing shapes in two and three dimensions.

### QuickTime

Mac OS X comes packaged with the latest version of QuickTime, a powerful multimedia technology for manipulating, enhancing, and storing video, sound, animation, graphics, text, music, and even 360-degree virtual reality. It also allows streaming of either live or stored digital video. As a cross-platform technology, QuickTime can deliver content on Macintosh and Windows systems. Augmenting its cross-platform capabilities, QuickTime supports every major file format for images and every significant professional file format for video.

Through the QuickTime plug-in, QuickTime's digital video streaming capability is extended to all popular web



Mac OS X system architecture



browsers. The plug-in supports over thirty different media types and makes it possible to view over 80 percent of all Internet media. QuickTime also features other advanced web streaming capabilities, such as movie "hot spots" and automatic web page launching.

## User Interface

The most visible expression of Mac OS X power and technology is its new user interface, Aqua. Apple applies its leadership in user interface design to Aqua, incorporating many of the qualities and characteristics Macintosh users expect, while adding advancements to benefit expert and novice users alike. Ease of use is factored into every feature and capability.

Consistent with Apple's design philosophy, visual enhancements serve not just as beautiful images, but as cues to the functionality and operation of the system.



A prime example of this user-focused design is the use of "sheets." These non-modal dialog boxes attach directly to the title bar of the relevant document, intuitively linking document and action. The non-modal nature of sheets prevents applications from hijacking the system and interrupting user workflow.

## Interoperability

Mac OS X makes unprecedented use of technologies and standards that allow interaction with other platforms. This affords both developers and users the opportunity to use Macintosh computers in new places and in new ways. Mac OS X manages multiple file and networking formats and supports a wide range of industry-standard protocols. Based on an enhanced VFS design, the file system supports multiple local formats and complies with POSIX file system semantics.

Hardware connectivity is simplified through built-in support for Ethernet (10/100/1000Base-T); serial connections for modems, ISDN, DSL; wireless networking through AirPort (IEEE 802.11); USB (Universal Serial Bus); and FireWire (IEEE 1394).

## Java 2 Standard Edition

Mac OS X ships with a complete implementation of Java 2 Standard Edition (J2SE) version 1.3, including the HotSpot client virtual machine. Benefits of Apple's Java

implementation include access to Aqua user interface elements "for free" through Swing, native preemptive multitasking, automatic multiprocessing support and management of JAR files as shared libraries.

This last advance improves the speed of execution and reduces the RAM footprint of applications which rely on the same archive, such as applications within suites. Mac OS X also plugs the Java windowing toolkit more directly into the Mac's native windowing toolkit, giving Java applications and applets the graphics performance benefits of Quartz.

## Backward Compatibility

To afford users a gentle migration path, Mac OS X builds on Darwin's ability to manage multiple application environments simultaneously. The Classic environment is actually a full version of Mac OS 9.1 running in a protected memory space under Mac OS X. As a result, most Mac OS 9 compatible applications will run side-by-side with Mac OS X applications.

Additionally, developers can code for Carbon, a native Mac OS X environment that allows programmers to take advantage of advanced Mac OS X features while retaining compatibility with the installed base of Macintosh computers running Mac OS 8.1 and later.

## Development Options

There are multiple ways to develop for Mac OS X. Individual skills, preferred languages and tools, target user base, and time to market concerns will influence a developer's approach:

### Carbon

The Carbon APIs are based on earlier Mac OS APIs. While Carbon allows applications to take advantage of Mac OS X features such as multiprocessing support and the Aqua user interface, Carbon is specifically designed to allow compatibility with older versions of the Mac OS.

### Cocoa

The Cocoa application environment runs natively under Mac OS X. For those who wish to develop for Mac OS X using rapid application development (RAD) tools and object-oriented techniques, the Cocoa frameworks provide a fast and complete way to do so. These frameworks offer both Java and Objective-C APIs.

### Java

The Java application environment allows development and execution of Java programs on Mac OS X, including



100% Pure Java applications and applets. The J2SE implementation in Mac OS X is designed to allow maximum Java application portability. Developers can also use the Java development language to write a Cocoa application, allowing Java programmers to use a familiar language to develop for a new platform.

## UNIX

Since Mac OS X is built atop a UNIX kernel, porting UNIX-based applications to the platform is relatively easy. This enables enterprise-level UNIX products to enjoy parity with consumer and business applications on a commercial desktop platform.

Mac OS X offers opportunities for developers from many different backgrounds to port and build innovative and compelling applications.

And the best way to get started is with the Apple Developer Connection:

Apple Developer Connection membership programs offer benefits such as prerelease software testing, code-level technical support, news and technology updates, and discounts on business support services. Developer documentation and resources are available free at <http://www.apple.com/developer>.

To learn more about developing for Mac OS X, visit the Mac OS X development website at <http://developer.apple.com/macosx>.

To request a free **Programming for Mac OS X CD-ROM** containing tutorials, sample code, and technical documentation designed to provide step-by-step descriptions of the methods developers can use to create Mac OS X applications, visit <http://developer.apple.com/sdtimes.html>.



A D C

Apple Developer Connection



# NetManage Rumbas With Java

BY ALAN ZEICHICK

Let's get ready to Rumba! NetManage Inc. is upgrading its Rumba Web-to-host connectivity suite to include new features, such as a richer implementation

of its Java client, that should help its customers migrate applications from traditional host emulation to the Internet.

It was only 18 months ago that NetManage Inc. (www.

netmanage.com) purchased Wall Data Inc., creator of the Rumba suite. According to Debbie Newton, NetManage's director of product marketing, Wall Data had recently introduced the first

Web-enabled version of Rumba, and was pushing its customers hard to abandon their traditional "green screen" access and move to a browser-based solution. That wasn't working. "It wasn't a 'move everything' type of solution, and this left the customer confused. NetManage [after it bought Wall Data] saw

that you'll want some traditional green-screen access, some green-screen access in a browser and some with a new graphical user interface."

To that end, said Dana Cole, product marketing manager for Rumba 4.0, the goal was to ensure that both the traditional and browser-based version of the solution worked identically. "If you're already a Rumba customer and go to the Web, your macros, keyboard maps and user interface aren't changing," she said. Cole claimed that in comparison to competing products from Attachmate Inc. and WRQ Inc., Rumba 4.0—which was due to ship in early April—makes it easy for users and managers to migrate between traditional LAN-based host clients and the browser version.

Other new features in Rumba 4.0 include Secure Sockets Layer communication over the Internet, and an increased emphasis on the quality of the Java client used during Web-based host access sessions. "We had a Java client before, but we wanted to let our customers have a real choice between Java and ActiveX," said Cole. "If you wanted macros or native file transfer on most platforms, you needed to use ActiveX." Now, according to Cole, there is functional parity between Java and ActiveX. "Traditional Windows shops will use ActiveX and will want nothing to do with Java," she said, "but some IT departments prefer to use Java."

The other major new feature, said Newton, is "Local Start," which ensures that even if the Rumba server is down or unavailable, the Web-based client can initiate the remote terminal session. "With the 3.0 version, a client would connect to the host system, but still maintained a link to the Rumba server. In 4.0, the client will download all the code it needs [for the connection]," she said. If the client initiates a session, it will look for the Rumba server to see if there's new software or configuration information. But if it's not there, she said, the session can still happen. "This eliminates a single point of failure," she added.

Rumba 4.0 is sold by the client seat, with no restrictions on the number of mainframe, midrange, Unix or Windows sessions that each client can perform. Pricing is \$150 per seat, with volume pricing for 25 or more seats. ■

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# Web Services: Keep Them Open

BY ALAN ZEICHICK

ComponentSource is cheering—at least so far.

Microsoft Corp. had given ComponentSource early access to some of the HailStorm technology prior to its mid-March introduction, and according to ComponentSource, a component vendor community for ActiveX/COM, CORBA and EJB components, many of its members are transforming their component offerings into Web services based on Microsoft's .NET as well as Sun Microsystems Inc.'s Sun One platform—and many are predicted to take advantage of HailStorm as well.

HailStorm, announced in March, is a future Microsoft .NET offering that will allow vendors to use Microsoft's Passport portal to provide universal single-sign-on authentication and access user profiles, such as shared calendars, as a Web service. HailStorm will also allow Web services to process payments by using credit-card or other financial information stored on the Passport portal.

"I'm happy that Microsoft is going to use open standards like XML and SOAP," said Sam Patterson, CEO of ComponentSource ([www.componentsource.com](http://www.componentsource.com)). "After seeing the demos, from a developer's point of view, being able to access these services over the Web is quite compelling," he added.

"The biggest concern for developers," he said, "is that if you build applications based on Web services, what happens if the services aren't there? Not just perhaps because the vendor went out of business, but maybe a router went down." The solution, said Patterson, will be what he termed "federation"—deploying Web services on multiple servers across the Internet, perhaps with the ability for a developer to cache and locally execute those Web services that an application requires. ".NET and Sun One will all have some level of support [for high availability]," he said. "Everyone knows that this is a big issue." However, he added, since none of these platforms is yet shipping, it's too early to see what the high-availability models will actually be.

"Net services are just components running on someone else's server," concluded Patter-

son, "instead of your own servers." An advantage is that, unlike typical COM or EJB components, he said, Web services can be designed to assume the availability of other Web services. "You'll see Web ser-

vices become even more popular with developers than components because the Web services can play together—and they'll do it automatically," he said, adding that the big challenge is to ensure that the ven-

dors really do stick to open standards. "I'll be disappointed if they don't," he said.

According to Microsoft, an initial set of HailStorm services is scheduled to be available to developers in beta format later

this year, with the services being generally available in 2002. HailStorm functionality will be integrated into the forthcoming Windows XP, with compatibility promised for older versions of Windows, as well as other operating systems such as Linux, MacOS, Palm OS and Unix. ■

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# iEB Expo a Developer's Treat

BY DOUGLAS FINLAY

NEW YORK — Although the 8th annual Internet and e-Business Conference and Exposition (iEB) at the Jacob K. Javits Convention Center—co-produced by research group Gartner Group Inc. and Advanstar Communications Inc.—focused primarily on Internet business strategies, those strategies mean little without developer muscle and tools to execute them. New versions of development environments for Web applications, updated platforms to leverage existing data sources, and new mainframe programs that translate into XML shared the stage at this event, held in early April.

More than 11,000 individuals registered to attend the event, including both the technical conferences and the show floor, said Steve Engel, group show director of North American IT events at Advanstar Communications. Engel maintained that the recent fall of dot-coms did little to impact iEB, which he described as a business-to-business show, not a business-to-commerce show. "Even with all

the changes and fallout occurring within the software development industry, this show still draws programmers, Web developers, business and systems analysts and software managers because it still provides a strong backbone to the market," he said. Many of them were on hand to view the latest product offerings from exhibitors.

Among these exhibitors was **ActionPoint Inc.** with its XML Dialog Server version 2.0, which "adds libraries of predefined schemas, such as cities and names" to data, said Heather Cook, ActionPoint ([www.actionpoint.com](http://www.actionpoint.com)) spokesperson. The Dialog Server is a development environment for developers to build reusable XML schemas for use in interactive dialog boxes on Web pages, and comprises the server software, a dynamic Web interface to activate the dialog boxes through Java libraries, and a GUI environment for creating XML schemas, application logic and business rules.

The Dialog Server helps developers reduce Web development times dramatically, she

said, "because it requires no hard coding." The new version 2.0 also adds predefined libraries of financial information such as credit-card and loan information, Cook said, and is priced at \$120,000 per developer license.

Also on hand was **MediaServ Inc.**, with its updated J2EE-based BluePath Server, which accesses data from multiple sources and disperses it to online and mobile devices and to other applications. The new BluePath 2.0 can use XML, SOAP and Remote Method Invocation (RMI) to gather information from Web services, databases, external applications and Web sites.

"In version 1.0 we could only go straight to a Web application source," said Iain MacNeil, MediaServ's ([www.mediaserv.com](http://www.mediaserv.com)) director of consulting services. "But with version 2.0 we can now go to any other source whatsoever, including databases, classes and customer relationship management applications, for example." While the majority of applications are written in Java, he maintained the applica-

tion could access any data source using a simple remote procedure call to access the data.

**InnerAccess Technologies Inc.** exhibited version 2.0 of its mainframe-to-XML data translation program that now supports use of CICS Business Transaction Services in addition to two-phase commit, in which users are alerted to real-time events from one mainframe or *n*-tier system to another. Ann Coppinger, InnerAccess ([www.inneraccesstech.com](http://www.inneraccesstech.com)) spokesperson, said version 2.0 is ideal for CICS, IDMS and IMS environments.

InnerAccess is a Java bean that runs on a mainframe or other J2EE-based database server, which can accept an XML request, search the database for the requested information and send it back as XML data. According to the company, InnerAccess provides full access to mainframe data as well as data in DB2, Oracle and SQL Server databases.

Coppinger said of particular importance to users is the two-phase commit feature in version

2.0, which alerts users when a transaction has been completed in one database at the request of another database.

**WebMap Technologies Inc.** ([www.webmap.com](http://www.webmap.com)) used the iEB event to launch its WebMap Server, which visually presents information stored in a database.

"Visual presentation comes in the form of icons, categories and topologies on the screen," said Ohad Ranen, WebMap Technologies' CTO. When the user floats the arrow over an icon, a wizard provides information about the icon, which is itself a representation of categories of information. Clicking on the icon drills the map down to 15 deeper maps, each revealing more detailed categories. Ranen called WebMap a "more intuitive method of revealing data," and said such visual presentations could help enterprise developers by making it easier for them to find reusable code for use in other applications.

The WebMap Server takes data from DB2, Oracle and SQL servers, as well as mainframes. Available now, pricing depends on the quantity of data to be translated. ■

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# Automation Dominates XML DevCon

Attendance drops 43 percent from last year, but enthusiasm remains high

BY DAVID RUBINSTEIN

NEW YORK — The implementation of XML in the creation of Web services and to facilitate e-business drew more than 2,000

delegates and exhibition attendees to last month's XML DevCon 2001 conference and exposition at the New York Marriott Marquis, according to event

organizers. The number marks a 43 percent decline in attendance from figures released at last year's event.

The conference was the first

produced solely by Camelot Communications Corp. after a bitter split with former partner SYS-CON Media, publisher of XML Journal. SYS-CON used

its Web site, publications and frequent e-mail messages to subscribers to run down XML DevCon and promote its competing XML Edge conference, to be held later this year. (SD Times was a media sponsor of XML DevCon, as it is of many industry events.)

In fact, SYS-CON put one vendor, EBProvider Inc., in an awkward spot. EBProvider was an exhibitor at XML DevCon and was also listed as a sponsor on an e-mail message disseminated by SYS-CON that claimed, "XML DevCon 2001 opened today in New York, with empty classrooms and a disappointing turnout on the exhibit floor." In response, Sanjay Singh, EBProvider's CEO, told SD Times, "We do not endorse the content of the [SYS-CON] e-mail. We didn't know the content of the e-mail, and the purpose of becoming a sponsor was to announce the launch of our product at DevCon."

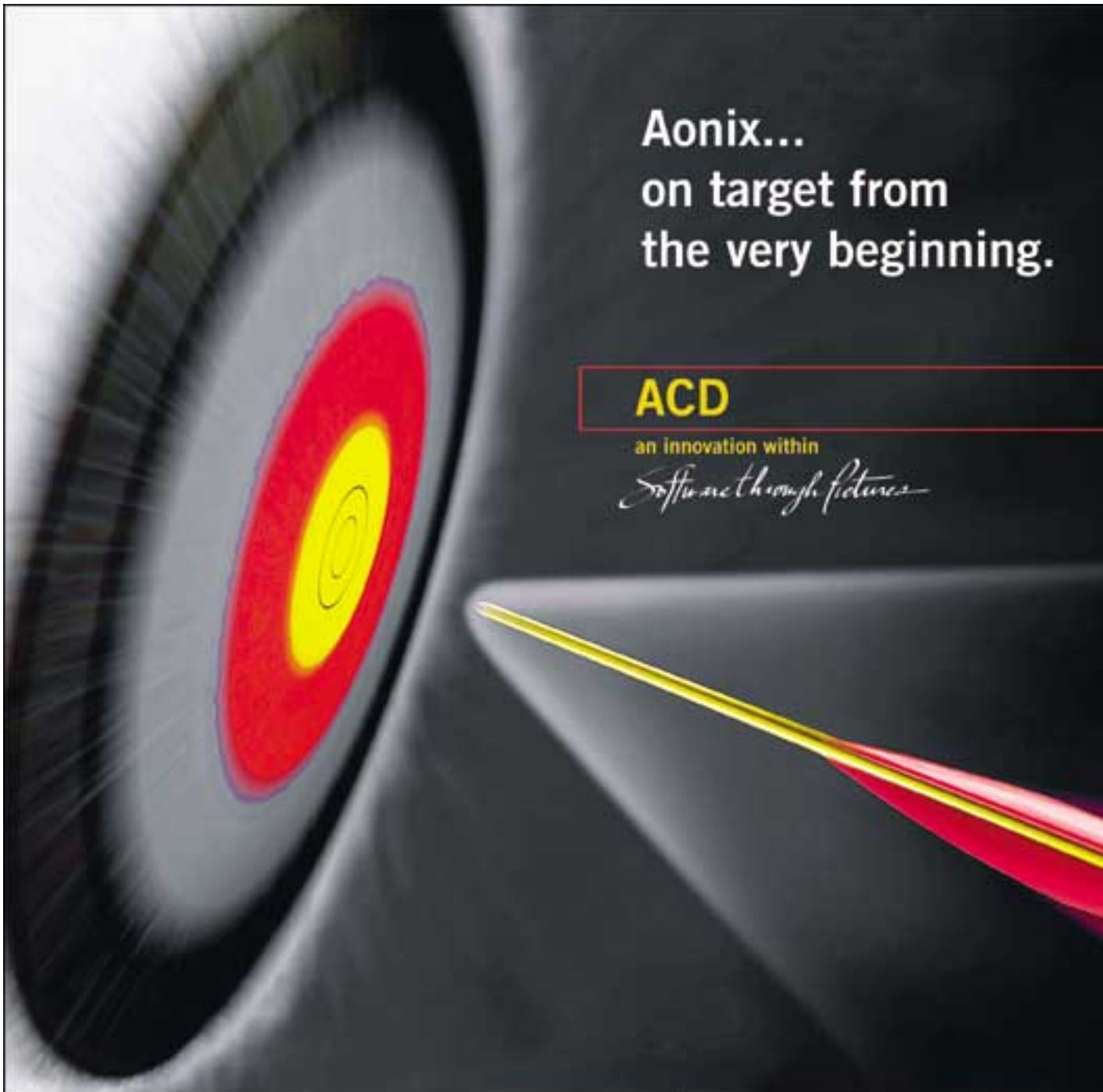
While attendance was down, exhibitors interviewed for this article said XML DevCon was a good experience for them, claiming new partnerships and business agreements were forged. Also, they used the exhibition to debut new products and updates to existing solutions.

**EBProvider**, a new company based in Arlington, Va., and New Delhi, India, announced the release of XSL Wiz 2.0, a tool that automatically generates XSLT script from a graphical environment. "The whole idea of XML is to remove manual interaction," said EBProvider's Singh. "This is the first step to not have to code XSLT."

XSL Wiz 2.0 can infer schemas from an XML document and convert Document Type Definitions (DTDs) to schema, reducing programming time significantly, Singh said. The generated XSLT script can be used for XML-to-XML translation. In the next release of the product, Singh said, XML-to-HTML mapping will be available. No time frame for that release was given.

Among new features in XSL Wiz 2.0 are namespace support in schemas, support of recursion in schemas as well as DTDs and compliance with SOAP. The tool is available for a free seven-day trial or can be purchased for \$995 at [www.ebprovider.com](http://www.ebprovider.com).

Singh indicated the company will also release Xintegrate, a server that it claims can extract



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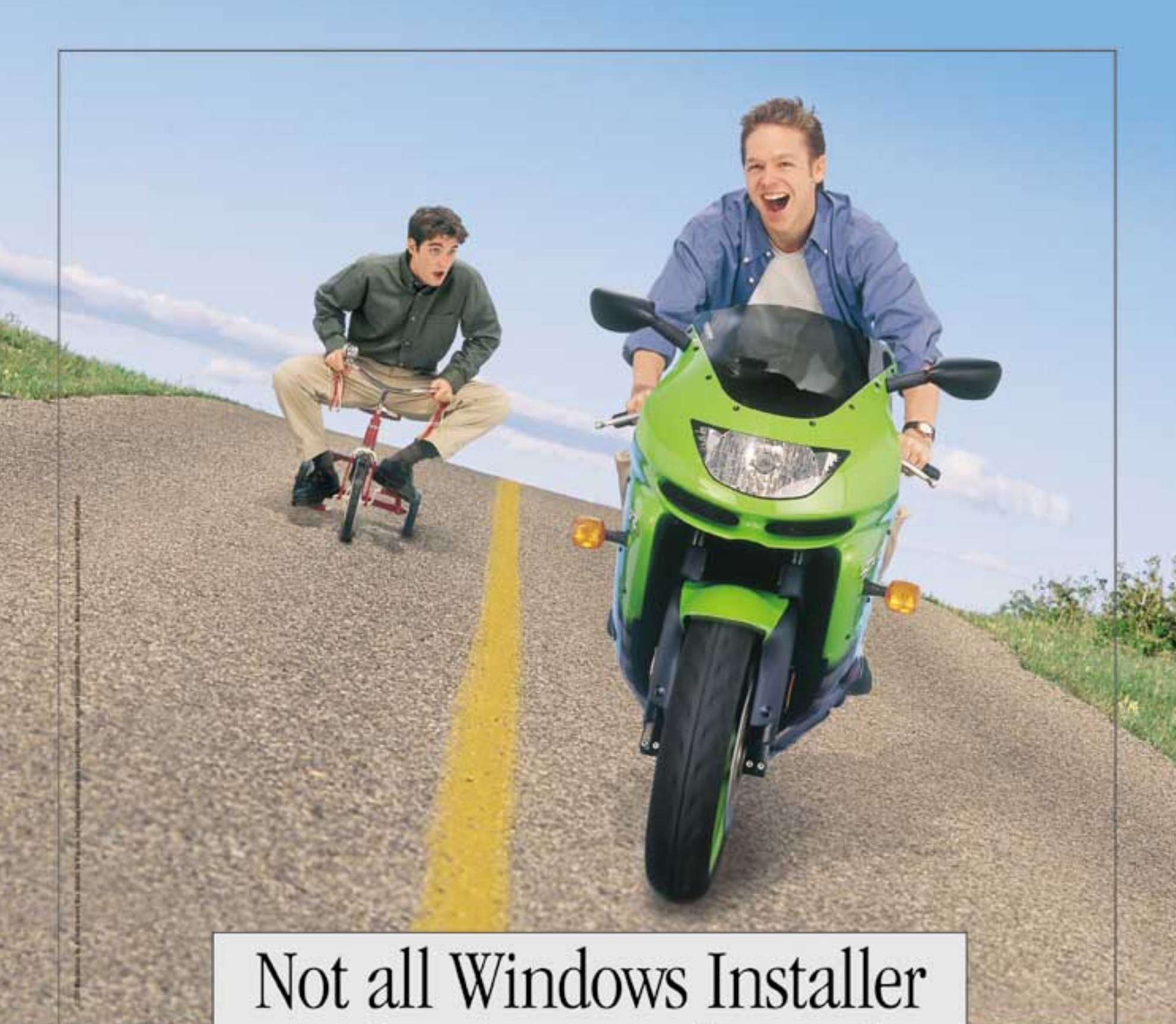
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## XML DEVCON

← continued from page 12

data from any source in XML and make it available for other uses, by the end of this month. "This should become a ubiquitous tool for every machine that talks to other machines," Singh said. Xintegrate will support

Linux, Solaris and Windows 2000, he said.

**InfoShark Inc.** has released version 3.1 of its XMLShark data integration software solution for IBM DB2, Oracle and Microsoft SQL Server. Written in Java, XMLShark is guaranteed to run across any platform, according to InfoShark ([www.infoshark.com](http://www.infoshark.com))

vice president of marketing Ruth Ann Rich. New features of 3.1 include accelerated and more robust mapping functionality, replication of the database with a single keystroke, the ability to pull data for exchange as well as pushing it, and the ability to view data source subsets over the Internet and save data

to an HTML file. The cost of the full suite is \$50,000 per server with piecemeal pricing available for the ViewShark, DataShark and Shark CARD XML Schema components.

For a native XML database solution that is schema independent and DTD independent, **XYZFind Corp.** has introduced

the XYZFind server, which does not require anything more than a document itself to include that document in a database, according to XYZFind ([www.xyzfind.com](http://www.xyzfind.com)) product manager Kelvin Ginn. The server parses the document to infer its schema, doing away with the need for a DTD, before breaking it down into components to be stored in the "universal schema," he said. The data is stored to that universal schema, he said, with the top-level tag defining the document's schema. XYZFind offers query access to the database, document tag or document itself.

XYZFind is written in C++ and is supported on Linux, Solaris and Windows NT/2000. New features expected in the next release, due out in beta this month, include concurrent read/write capability and date support—"if there's enough time"—Ginn said. Pricing was not available.

**X-Aware Inc.**'s Avantio 2.0 integration software suite, available now, enables companies to represent their data sources as a virtual XML database, claims X-Aware ([www.xaware.com](http://www.xaware.com)). The suite consists of an XML server and an integrated development environment to allow companies to integrate existing systems into a single platform as well as provide information to business partners, the company said. The server relies on the concept of data chaining, which allows all data related to a query to be retrieved as a single unit.

Avantio 2.0's IDE runs on any Windows platform, and eases development of XML views in the virtual XML database, the company said, through the use of wizards, templates and drag-and-drop functionality. Server systems for Java and Windows NT/2000 are being offered at an introductory price of \$10,000.

Also at the show, **NeoCore**, an XML information management company, reported it has received \$10.4 million in financing from a venture group led by Baker Capital of New York. The money will help the company ([www.neocore.com](http://www.neocore.com)) grow from 33 to near 100 employees and fund more research and development, according to Ken Whittington, senior vice president of XML products. The funding was based on the company's release last October of its XML Information Server, which Whittington said was designed for high-volume, complex XML transaction processing. ■



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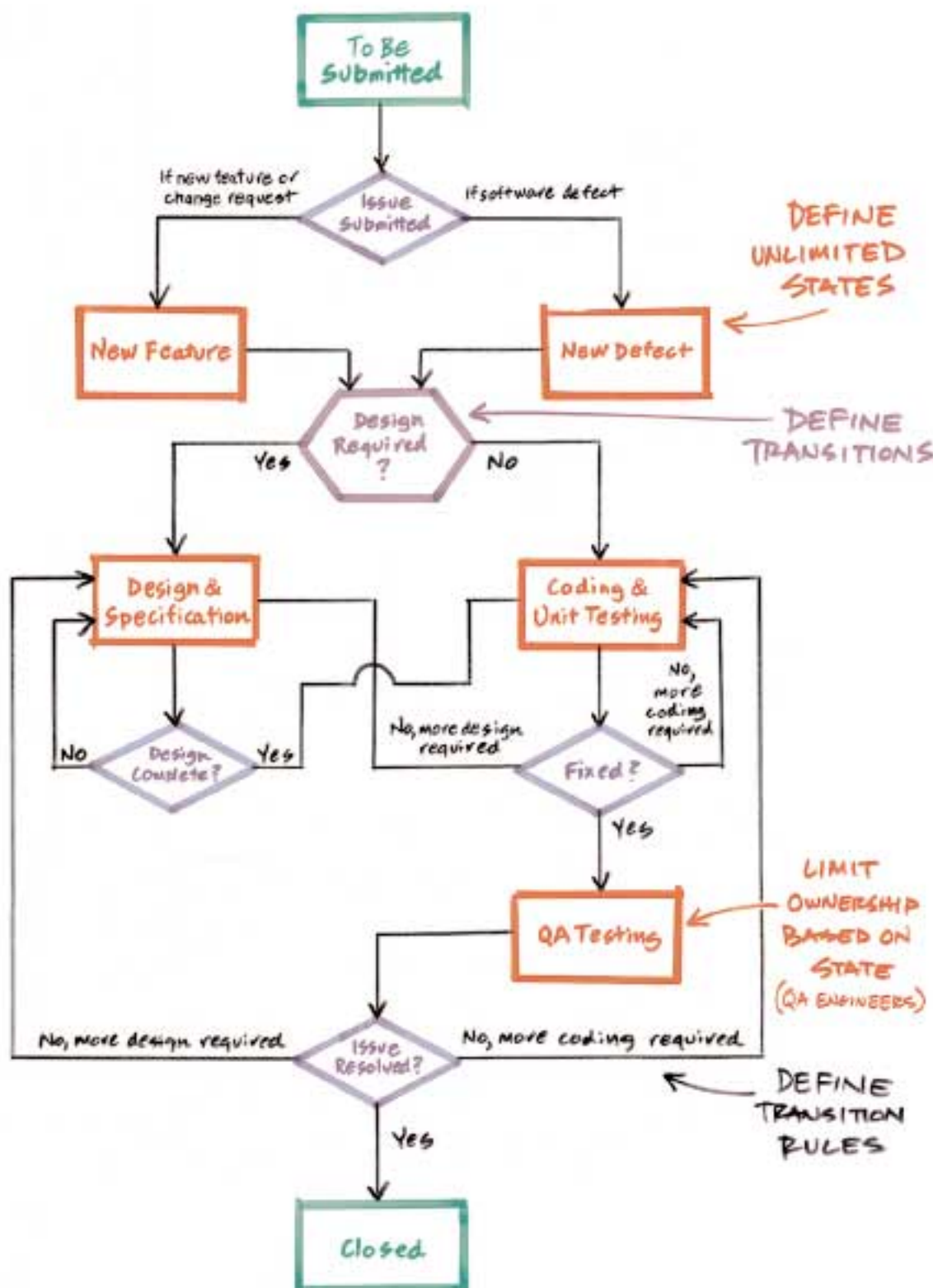


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# JavaOne Conference Gets an Extra Day

More classes, exhibits to be accommodated at San Francisco event

BY CHRISTINA PURPI

The largest gathering of Java developers, IT managers and business managers is getting even bigger. Thanks to the

proliferation of new technologies and topics surrounding Java, the sixth annual JavaOne Conference will be adding a day to its already full sched-

ule of classes, demonstrations, exhibits and keynote speeches.

Sponsored by Sun Microsystems Inc., JavaOne is now scheduled to take place from

June 4 to June 8 at the Moscone Convention Center in San Francisco. The courses are organized into seven tracks: "Web, Services and Beyond,"

"Java Technologies for the Desktop: Web to PC," "New and Cool," "Smart Devices: The Modern Client," "Java Technology at Work," "Putting It to the Metal," and "Exposing the Core."

With 65 technical sessions added to this year's agenda, the conference is offering more than 260 sessions in total, including topics such as "Creating Mobile Services using the Java Programming Language," for the more advanced users; and "Adding Audio and Video to Consumer



Devices With the Java Media Framework," for programmers on the intermediate level. Participants also can attend the JavaOne Pavilion, which will provide the locale for hundreds of company exhibits over four days.

As of press time, keynote speakers for this conference were yet to be determined; they will be announced in mid-May. ■



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## JAVAONE

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### JAVAONE PAVILION:

Sneak Preview: **Sunday**, June 3,  
6 p.m.-9 p.m.

**Monday**, Noon-8:30 p.m.

**Tuesday**, 10 a.m.-7 p.m.

**Wednesday**, 10 a.m.-7 p.m.

**Thursday**, 10 a.m.-3 p.m.

### JAVA UNIVERSITY PROGRAM:

**Saturday** and **Sunday**, June 2-3

(Evening Sessions: **Monday**  
and **Tuesday**)

### KEYNOTE SPEAKERS:

**Monday**, 9:30 a.m.-11:30 a.m.,  
1:30 p.m.-3:30 p.m.

**Tuesday**, 8:30 a.m.-10:30 a.m.  
Speakers to be announced.

### REGISTRATION:

#### JavaOne Conference:

**Sunday**, Noon-9 p.m.

**Monday**, 7 a.m.-9 p.m.

**Tuesday**, 7 a.m.-6 p.m.

**Wednesday**, 7 a.m.-6 p.m.

**Thursday**, 7 a.m.-6 p.m.

**Friday**, 7 a.m.-Noon

#### Java University:

**Friday**, June 1, 2 p.m.-8 p.m.

**Saturday**, June 2, 7 a.m.-4 p.m.

**Sunday**, June 3, 7 a.m.-Noon

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# Build Accountability Into Design

Focus on prevention is one vendor's way of solving software breaks

BY LISA NADILE

With e-commerce efforts dampened by tightened purses and bear-shocked CFOs, software developers are charged more

than ever with knitting reliability into their applications. Risk management is a buzzword regaining its potency in light of recent software infrastructure

failures and hack attacks at such sites as eBay and Hershey.

Companies are turning to risk-management consultants like Jawz Inc., Risk Services &

Technology and Cigital Inc., which works with integrators and IT staff during software development and deployment. Formerly Reliable Software

Technologies, Cigital (www.cigital.com) creates a development strategy that impresses accountability of functionality into any software design.

"There's an awful lot of attention today to the hack of the week or virus of the day. People talk a lot about cryptography and a lot about firewalls, but people are missing the point. The point is, in order to really get security to work properly, you have to get the software to work properly," said Gary McGraw, vice president of technology for the Dulles, Va.-based company.

According to Jeffery Payne, Cigital's president and CEO, most clients still are patching holes and locking backdoors after the fact. "We're still being brought in during the overhaul of legacy systems," he said.

Many an overworked IT staff may welcome the assistance of a consultant to watch over their shoulders during the design phase. However, education of the head office still is necessary. With companies facing increasing pressure to flip the switch on the e-commerce system, longer QA and security testing times are difficult for CEOs and CFOs to swallow, said Payne.

Cigital markets its strategy under the brand Cigital Advantage, which it says is a series of steps and processes to add focus on reliability and security during development. A company must identify not only potential flaws in a software e-commerce tool, but also what effect a failure or malfunction would have. Using this knowledge during the design of the tool makes risk management an integral part of the process.

Then a company can defuse those risks by designing a tool that meets these contingencies. The key is the creation of a business tool that is reliable and that reflects the company's most efficient business process.

"We perform up-front analyses to define real-world product requirements and identify the associated risks, develop and conduct performance modeling and load testing, and bridge the gap between QA and product development," said McGraw.

The interaction of software components is a whole new science, and one that is giving companies the most trouble when it comes to building unbreakable software systems, said McGraw. Smoothing the paths among third-party products is another.



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# HotDispatch Targets Enterprise

BY DAVID RUBINSTEIN

With an improved Web interface and new billing scheme, online technical knowledge exchange HotDispatch Inc. is trying to broaden its user base with a foothold into corporate IT shops.

HotDispatch, which offers answers to technical questions as well as access to developers to work on projects, has created two new services to make HotDispatch a more useful, manageable commodity in the enterprise. Corporate Accounts allows development managers to track the activity of team members as well as monitor billing. HotDispatch claims enterprise

teams can use this service to avoid missing project deadlines due to limited staffing and resources and to save on IT support costs by using the service.

The second new service is

called Corporate OfficeFronts, which allows enterprises to establish a virtual storefront on the HotDispatch site, from which it can showcase its services and software.

"Corporations can now leverage online marketplaces to ensure productivity for their projects," said CEO Mike Kaul in a statement.

In a related move, HotDispatch has revamped its Web site's interface to offer an e-mail-style presentation familiar to developers and a new task dash-

board, which enables users to immediately access information of interest. The company also has added a "Tell a Friend" button for forwarding questions or projects outside the HotDispatch community. The search algorithm on the site ([www.hotdispatch.com](http://www.hotdispatch.com)) also has been redesigned, said the company. ■

## ACCOUNTABILITY

◀ continued from page 18

Tiny hiccups can shut a huge transaction down for days while IT drops everything they're working on to dig through code to find the problem, he said.

### THE ABCs

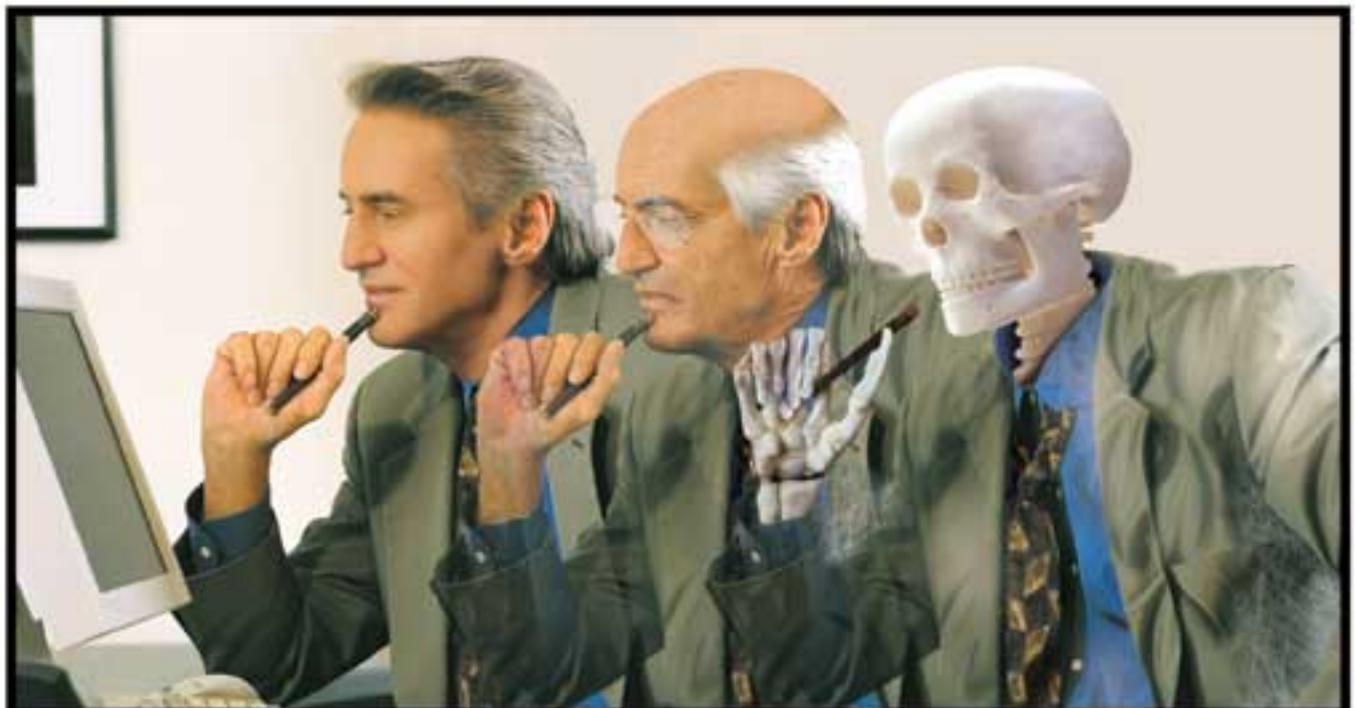
Statistics and algorithms aside, McGraw said all developers should remember the basic risks as they build applications.

To begin with, developers must remember they most often sabotage their own work by not guarding against such occurrences as buffer overflows. "If you overflow a certain kind of buffer properly, then you carry out a stack-smashing attack. The way this works is you overwrite the stack in the OS, and you cause your own attack code to execute. You create your attack, and you cause the computer to jump to your own code and it begins to run it. And that is how you take the computer over," said McGraw.

"The industry has understood this problem since the 1970s, and yet it continues to allow it, because even the best developers and architects have little or no security experience, through no fault of their own. It's just a lack of education," he said.

Open doors in access control and lack of limitations in input validation invite bad people into a system, he said.

McGraw also said that lack of password protection, faulty database security and insufficient use of cryptography are obvious and yet most overlooked areas in software development. ■



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# GoXML Suite Creates a Strong Foundation

BY DOUGLAS FINLAY

NEW YORK — XML Global Technologies Inc. is delivering on its long-planned strategy of combining XML transactions, searches and storage into one integrated suite with the

release of its GoXML Foundation Suite at iEB Expo, co-produced by Gartner Group Inc. and Advanstar Communications Inc. at the Jacob K. Javits Convention Center last month.

"With the rapid acceptance of

XML within the enterprise, coupled with the huge amount of XML data that now exists," the Foundation Suite became the logical progression for the company (www.xmlglobal.com) to make, said Jim Dorey, XML

Global's senior product manager. Aimed primarily at small-to-medium enterprises, the suite integrates the company's three existing products: GoXML Transformation, an engine for transforming other formats such

as EDI and HTML into XML, and vice versa; GoXML Search, an XML-based search engine also utilizing English text commands; and GoXML DB, a native XML database featuring an XPath query engine. The suite also features a Java SDK for building Web interfaces.

Dorey said that the combination is designed to help alleviate or eliminate data management inefficiencies such as lack of collaboration and slow access times to data. The time required to search for data is also dramatically reduced, he claimed, because the XML data can be stored in clusters, reducing the seek times.

"The transformation piece will enable developers to bring data files out from mainframes and *n*-tier systems and into current databases," Dorey said. Once transformed into XML using mapping templates, the data can be searched using XML and text commands, which Dorey said are used primarily to recognize or define the categories of information where XML data resides. "With the language now the same, as in XML, it promotes collaboration within the enterprise and within collaboration rooms in e-commerce sites," he said.

Dorey also said developers would be able to construct concatenations—strings of data placed together—with less difficulty because transformations will make data easier to search and combine.

Also due this month from the company is GoXML Central, essentially an ebXML framework sitting atop the Foundation Suite providing a business registry and the Simple Object Access Protocol for enterprises seeking to establish collaboration agreements over the Internet.

The GoXML Foundation Suite is available now for Linux 2.2, Solaris 8 and Windows NT/2000 operating systems. All versions are priced at \$80,000 per server, utilizing up to four microprocessors, and \$160,000 per server if there are between five and eight processors. ■



The suite will eliminate data management inefficiencies, says XML Global's Dorey.

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## COLDFUSION

◀ continued from page 1

ported formats include GIF, JPEG and Flash. The new release includes an interface for the Crystal Reports engine for the creation of tabular reports from queried data, as well as an enhanced search engine.

Also, the updated ColdFusion includes the ability to perform queries of queries via a new CFSQL tag. "Query of queries allows you to take a query of a database and of an OLAP directory server, for example, and bring them together in ColdFusion," Costa said. It also provides the ability

to execute SQL queries against data result sets in memory, he explained, which boosts performance by eliminating the need to go back into the database with each new query.

Other new features in the release include the ability to define functions in CFScript and have the function be

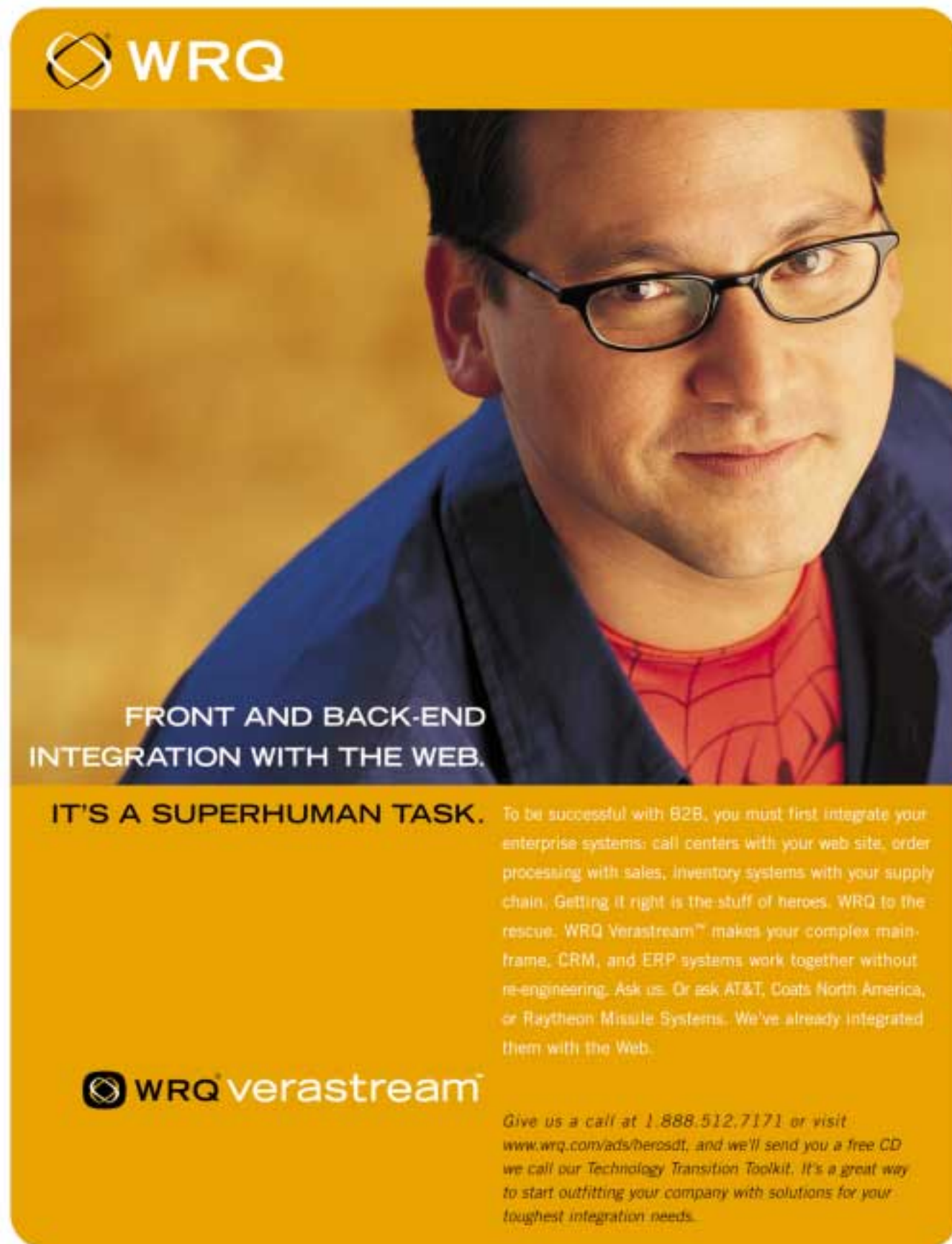
callable from any CFScript for use in any ColdFusion application, Costa said. "Developers can customize the environment to the kind of apps they're building," he said. "They're publishing and sharing functions within the ColdFusion community, much like [CFML] tags."

ColdFusion 5.0 includes a

management console from which Web applications can be packaged, archived and deployed. The console, Costa said, enables wrapping data, files and configuration settings into a single file to be deployed to other servers or to store. With a new CFFLUSH tag, developers can exercise control over the delivery to a browser of different parts of a Web page, allowing for complex pages to be sent to the browser in increments to provide end users with the most up-to-the-minute experience possible, according to the company ([www.macromedia.com](http://www.macromedia.com)). Enhanced administration functions include customizable alerts that can either send notification or prompt recovery action, Costa said. ColdFusion 5.0 now includes support for Cobalt Qube, RaQ, SuSE and XTR servers. It will be generally available by early summer, Costa said, and final pricing has not yet been set.

The new release of ColdFusion, Costa said, highlights "the synergies between Macromedia and Allaire," under whose stewardship ColdFusion was developed. "We'll have a stronger worldwide reach" because of Macromedia's global strength, he said. The product also aims to reduce time-to-market by handling low-level Web programming automatically—"ASP and JSP take two to three times as much code just to do the same thing," Costa said—and to help businesses complete projects with immediate impact on their business.

For the future, Costa explained that Macromedia is working on the Neo project, which is to be the next generation of ColdFusion. He said Neo, which is now in early alpha development, will build on ColdFusion with an enhanced set of application services and a new infrastructure based on the JRun application server. ColdFusion, he said, consists of three layers: CFML, an application services layer and an infrastructure layer. "[Neo] builds on 5.0 and takes it in a new architectural direction," Costa said of the project, which the company hopes to have completed in the first half of next year. Because the infrastructure will be built upon JRun, which last month passed the J2EE compatibility test suite, more opportunities exist for such third-party services as application development tools and services and search engines. ■



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## WIND RIVER

◀ continued from page 1

do now is make it easier for our customers to build an embedded application at whatever level."

This was demonstrated, Fiddler said, by the circumstances that brought BSDi (www.bsd.com) and Wind River together. "Our conversations with BSDi did not start with this acquisition in mind. They started with BSDi approaching us saying they were being dragged into embedded." BSDi was developing devices for the high end of the embedded market, such as control processors for routers and telephone switches, and network attached storage systems. The devices were running both Unix and VxWorks.

But according to Michael Tiemann, CTO of Linux software developer Red Hat Inc., Wind River is expanding because "VxWorks and pSOS have reached the limits of their proprietary implementations." Tiemann said that the move also validates open source as a necessary strategy today. "By purchasing BSDi, Wind River is saying that the only credible way to enter the post-PC market is with open-source technologies." And Tiemann also believes that its choice of BSD



Wind River still wants some control, says Red Hat's Tiemann.

Unix, rather than the open-source Linux, indicates Wind River's unwillingness to totally surrender control. "They don't trust their strategy enough to give their customers all the freedoms that Linux offers; hence

they chose BSD, which can be made proprietary at any time."

But Fiddler said that his company's decision not to use Linux was based mostly on the GPL licensing scheme, which he described as imprecise, and which could force developers to return their intellectual property to the community. "Our customers who don't want to [contribute] their software are afraid of it because [GPL] is so uncertain. When you make an embedded device, it's unclear what's an application and what's the system," he said, referring to the common practice in embedded systems of linking a developer's source code to the Linux kernel, thereby causing it to fall under

requirements of the GPL. "BSD is truly free open source, unlike GPL, which is free only if you make your software free," he said.

Wind River (www.windriver.com) acquired all of BSDi's software assets for an undisclosed sum, including FreeBSD, embedded operating

system eBSD and many of BSDi's employees, about 50 in all. Fiddler said that it seemed logical for Wind River to diversify. "It gives us a full range of operating systems. And the nice thing about it is that it will all be tied together with a common value chain. If you're developing an end-to-end sys-

tem, you want to use a common tool chain, so it made perfect sense."

Part of the Wind River plan will be to continue developing FreeBSD, something that Fiddler believes BSDi would not have been able to do long term. "BSD is in almost every way a superior solution to oth-

er open-source solutions out there, certainly for the embedded world, and the community is well organized. Yet it wasn't getting the support that would allow it to blossom." Jordan Hubbard, a central figure in the FreeBSD project, will join Wind River and continue to manage the project. ■

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# MapuSoft Unveils VxWorks-to-Nucleus Migration Tool

Software kit uses API mapping to convert applications to royalty-free RTOS

BY EDWARD J. CORREIA

If it's true that imitation is the sincerest form of flattery, does that also apply to emulation and API mapping?

If so, software developer MapuSoft Technologies LLC is paying homage to Wind River Systems Inc. with the release of OSChanger, an API conversion tool that is claimed to combine emulation and API mapping to give developers an easy migration path from VxWorks to Nucleus, a royalty-free RTOS developed and marketed by Accelerated Technology Inc.

According to Raj Johnson, president and CEO of MapuSoft, one of the main advantages of OSChanger is that it can help move applications to the Nucleus royalty-free environment without the need to learn a new interface. "Once developers are familiar with one product—one operating system—they hesitate to give that up and start all over again on

another RTOS. If people have learned on one operating system, why not leverage that?"

OSChanger does its work, claims Johnson, by converting the ANSI C/C++ source code of a VxWorks application—most of which is operating-system independent—to source code for Nucleus. Portions of a program that access VxWorks directly through the VxWorks API are mapped to Nucleus. In cases

where no corresponding function exists in the target operating system, one is added or emulated. Developers have access to all the APIs of both RTOSes. "Our goal is to leverage the existing infrastructure and build on a successful RTOS, not to build a new one."

Although most of MapuSoft's current customers are OEMs, Johnson does not rule out the enterprise market, which he said is one that MapuSoft has largely

ignored. "This is the untapped market for us. This is a market where people do the porting by themselves and where our product can help."

MapuSoft (www.mapusoft.com) is not the first company to develop a tool designed to migrate projects away from VxWorks. In January, embedded Linux developer MontaVista

Software Inc. released tools aimed at enabling migration from VxWorks to Hard Hat Linux, the company's Linux distribution designed for embedded systems. Both tools were released as open-source projects. Johnson compared the MontaVista offering with OSChanger. "They have only five libraries; we have all 20 libraries," John-

son said, adding that before developing a VxWorks-to-Linux product, MapuSoft will wait to see if any particular Linux distribution becomes dominant. At present, Nucleus is the only platform targeted by OSChanger.

Available now, OSChanger is priced at \$9,995 per seat, including source code, and supports all Nucleus target processors. ■



MapuSoft's goal is to leverage a successful RTOS, not build a new one, says Johnson.

## ONCORE LAYS OUT VXWORKS STRATEGY

Embedded systems developer OnCore Systems Corp. has added an API for VxWorks to its list of operating systems supported by the OnCore OS real-time operating system. OnCore claims the new API will enable VxWorks applications to run unchanged along with applications of other operating systems in the same system with access to real-time responsiveness.

The OnCore OS (www.oncoresystems.com) uses a microprocessor's memory management unit to run multiple operating systems and their

applications in protected areas of memory, enabling developers to build embedded systems consisting of mixed operating-system environments, including Linux, pSOS and others. Proprietary technology enables applications to pass data between protected partitions with a direct mapping of virtual memory technique.

According to Chip Downing, OnCore's president and CEO, OnCore runs applications natively. "This is not an API conversion kit for converting working VxWorks code," he said, adding that the new APIs

let VxWorks applications be "safely integrated into a protected, mixed operating-system environment without converting applications."

Available now, the VxWorks APIs are provided in binary and source forms along with those for MicroC/OS-II, POSIX and C-Threads as part of the OnCore OS Development Kit. Pricing is negotiated individually and is based on volume. An upgrade will be provided free to existing OnCore OS Development Kit customers.

—Edward J. Correia

## Generic ATI Tools Target the Home-Grown RTOS

BY EDWARD J. CORREIA

Hoping to gain inroads with organizations that are building their own RTOSes, embedded solutions provider Accelerated Technology Inc. (ATI) has announced codelab, a family of RTOS-independent hardware and software development tools that it says will offer the ability to switch CPUs without changing peripherals. The company was scheduled to release the tool suite to beta in mid-April.

The kit will consist of the codelab embedded development environment; a hardware-assisted remote debugger and connection; and a series of CPU platforms and boards that will initially include ARM, MIPS and SH. Most significantly, the company claims that its debugger works with any real-time operating system.

"It's an RTOS-independent set of tools," said Ken McLeod, codelab's product marketing manager. This is accomplished,

he said, by integrating any existing RTOS, be it commercial or home-grown, with the codelab debugger. "We have an open API in our debugger, which developers can use to create a multitask debugging window that is aware of their custom RTOS."

ATI's flagship product is Nucleus, a real-time operating system, but McLeod said the company has been approached by developers interested not in Nucleus but in debugging tools for their companies' home-grown RTOSes, which are still seen in roughly half of all

embedded designs by most accounts. "If you're developing an RTOS knowing that 50 percent of the market is not interested in purchasing it, that leaves a huge market to go after," he said, explaining why they're offering their codelab tools for platforms other than Nucleus.

Those home-grown operating systems are a market that ATI (www.acceleratedtechnology.com) hopes to tap into, despite its opposition to the very concept. "We think that writing your own RTOS is the worst decision you can make because a commercial RTOS is a better

choice. Why not just pay \$7,000 and be done with it? Either way, developers need a solid set of tools that bring everything together from the software to the hardware."

McLeod said that what differentiates codelab is flexibility. The system centers around a motherboard stocked with interfaces and peripherals including IDE/ATA, disk

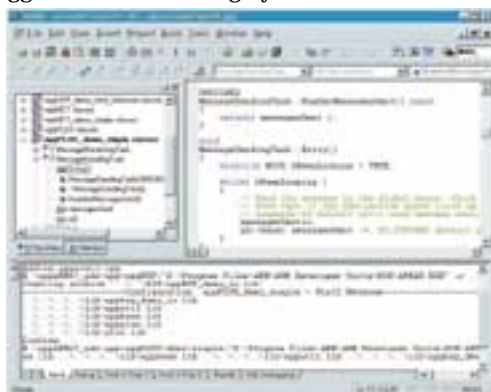


CPU modules can attach to the motherboard or run stand-alone.

drive, parallel, serial, IrDA, Ethernet, keyboard, mouse VGA, CompactFlash, USB and PCI. The platform also includes a daughterboard slot that can accept a processor card. "Since we have this motherboard-daughterboard combination, [developers] can switch to another processor without having to switch peripheral evaluation boards." CPU daughterboards also can run as stand-alone development

platforms, said McLeod.

The codelab family is scheduled for general release in July. Its base price of \$3,995 per seat will include the codelab EDE and Debug, and an evaluation daughterboard (with RAM and choice of ARM, MIPS or SH processor) plus Partner-J, a JTAG connector for direct processor access. Options will include a ROM emulator with JTAG device, for faster processor debugging. ■



The debugger works with any RTOS, according to ATI.

# MontaVista Unveils Hard Hat Linux 2.0

BY EDWARD J. CORREIA

Embedded Linux developer MontaVista Software Inc. has released Hard Hat Linux 2.0, the latest version of its Linux distribution for embedded systems that is now based on the Linux 2.4

kernel. The new version broadens target CPU and host platform support, and brings SMP and kernel pre-emption capabilities to x86 targets, with a promise to add the capabilities for PowerPC and MIPS in June.

Hard Hat Linux 2.0 adds the Hitachi SH family to its list of supported processors, and expands development host support to include Mandrake, SuSE and TurboLinux. The software also now supports the VMWare

Linux emulator running on Windows hosts, though only when using Red Hat Linux. Self-hosting is now also possible on x86 systems. In addition, the new version will offer some degree of fault tolerance; it reportedly includes JFS/Reiser file journaling for disk-based systems and JFFS for journaling to flash.

Further, the company will change the way it offers its software, saving the best features for paying customers. A professional edition will be available only to support subscribers, and will be offered for specific CPU architecture families, a departure from MontaVista's (www.mvista.com) previous multi-CPU distribution policy. This edition will include more than 200 Linux software packages, more than three times as many as previous versions, and a greater number of form factor and board support packages.

A free and unsupported "journeyman" edition, designed for evaluating the tools on Red Hat hosts only, will include a full set of development tools and support for multiple processor families but fewer individual CPUs and boards. The journeyman edition will include about 130 software packages. Both editions will remain as open-source projects.

Also new to version 2.0 is the target configuration tool (TCT), which, according to Bill Weinberg, MontaVista's director of marketing, greatly simplifies delivery of files from the host system to the target. "In the past, users have had to populate files by hand or build packages of files." Now a GUI-based tool manages kernel builds, the inclusion of kernel components and the size of the target image. Further optimization is offered through the Library Optimizer, which operates on the TCT output to trim unneeded libraries from the target file system.

Several of MontaVista's products, and some yet to come, are being parceled out as add-ons, which is a strategy that resulted from trial and error, according to Weinberg. "We had gone down the path of making vertical offerings and discovered that that's not how developers chose their tools," he said.

The initial add-on package will be a legacy RTOS porting kit, which includes VxWorks and pSOS porting tools. When the CD is released this month, the company says it will also release a Java kit and an embedded QT GUI toolkit from Troll Tech. The company is scheduled to release a high availability add-on kit in July. Add-ons are available only for the professional edition.

Available now for download, Hard Hat Linux 2.0 is scheduled to begin shipping on CD in May. Pricing had not been finalized at press time. ■

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9:00 to 10:30	Reserved (Subject TBA)	Automating Code Development for Device Drivers & Board Support Packages <i>Atmel &amp; Wind River</i>	ARM-based Technology: An Introduction and Update on New Developments, including ASISA <i>ARM</i>	HB: "Tiny Size" Your Design <i>Atmel</i>	TCP/IP for Embedded Systems <i>US Software</i>	Embedded Processor Benchmarking <i>ET&amp;C</i>	USB 2.0 Hands-On Workshop Part 1 Achieving a 40K Speed Increase with USB 2.0 "Current Developer Issues" "Difference from V.1.1" "System Benchmarking Analysis & Results" <i>Cypress Semiconductor</i>	Embedded Interworking for 8-Bit uCs: TCP/IP & Ethernet <i>K&amp;L</i>	Shorten Time-To-Market and Lower EMI on 8051-Based Embedded Projects <i>Philips</i>	Reserved (Subject TBA)	Reserved (Subject TBA)
11:00 to 12:30	Reserved (Subject TBA)			gC Solutions for 10-Bit Motor Control Applications <i>Infineon</i>	Embedded Interworking: Security & Privacy <i>ISA</i>	Introduction to Low-Power Embedded Processors <i>MicroDesign Resources</i>		Embedded Interworking for 8-Bit uCs: CAN <i>Philips</i>	Using CodeWarrior to Program & Debug Multiple StarCore DSPs <i>Motorola</i>	Reserved (Subject TBA)	HB: "Tiny Size" Your Design <i>Atmel</i>
1:00 to 2:30	Fast, Economical Connectivity Design <i>Viscom</i>	Processor Options for DSP Applications: gPs Vs. DSPs <i>Berkley Design</i>	StrongARM Solutions for Wireless Apps. <i>Intel</i>	16-Bit Web Tech for Remote Diagnostic Maint. <i>TD Components</i>	Embedded Interworking Solutions <i>ISA</i>	Introduction to High-Performance Embedded Processors <i>MicroDesign Resources</i>		Advanced Hardware Simulation with the eVision2 Debugger <i>K&amp;L Software</i>	In-Application Flash Programming Techniques <i>Philips</i>	Reserved (Subject TBA)	Data Filtering using the Motorola DSP560xx Family <i>Motorola</i>
3:00 to 4:30	Reserved (Subject TBA)	Selecting Processors for DSP Applications <i>Berkley Design</i>	Speeding the Dev. of Networked Devices: Techniques for Designing with SoCs <i>NEC/Sony</i>	LINUX Web Server on an Embedded PowerPC System <i>TD Components</i>	Reserved (Subject TBA)	Introduction to the Design of Information Appliances <i>MicroDesign Resources</i>		Embedded C Programming: Course on Basics of C Programming for Beginners <i>ISA</i>		Reserved (Subject TBA)	ARM Software Workshop <i>ARM</i>
5:00 to 6:30	Reserved (Subject TBA)	Embedded JAVA to Develop Intelligent Network Elements <i>Motorola</i>	Reserved (Subject TBA)	Reserved (Subject TBA)	Reserved (Subject TBA)	"Embedded for Dummies" Part 1 (A Must for MARCON) <i>Tom Walker, Philips</i>			StrongARM Solutions for Wireless Apps. <i>Intel</i>	Reserved (Subject TBA)	Real-Time Tracing of SW Execution from SoC Devices <i>EP</i>
Thursday May 31	Tutorial Room N1 501	Tutorial Room N1 401	Tutorial Room N2 401	Tutorial Room N2 501	Tutorial Room E1 603	Lecture Series Sorenson Hall	Lab Room E2 302	Lab Room E2 501	Lab Room E2 401	Lab Room E2 303	Lab Room E2 502
9:00 to 10:30	Become a IEEE-1394 Expert for Embedded Systems: Part 1 IEEE-1394 Overview: "Super Multi" Electrical Interface "Control & State Registers (CSR)" "Configuring a IEEE-1394 Bus" "Initiation" "Synchronization and Asynchronous Transfers" "PHY Link Interface" Transaction Retries "Evolution of the Standard" <i>MicroDesign Resources</i>	Atmel's AVR for Web Server & Embedded Internet Applications <i>Atmel</i>	ARM-based Technology: An Introduction and Update on New Developments, including ASISA <i>ARM</i>	Processor Options for DSP Applications: uPs Vs. DSPs <i>Berkley Design</i>	Creating an 8051 Derivative on Demand <i>Unisys</i>	Introduction to Bluetooth Atmel & Crossbar team for the day to present a technology & information case study on Bluetooth. The content includes solutions, comparing software, hardware and a complete development and support environment. This is an essential class for designers with Bluetooth applications. <i>ARM &amp; Unisys</i>	USB 2.0 Hands-On Workshop Part 2 "Chips & Hubs" "Transaction Translators" "Hosts & Drivers" "Applications" "Development Tools" "Compliance Issues" <i>Cypress Semiconductor</i>	Embedded Interworking for 16-Bit uCs: TCP/IP & Ethernet <i>K&amp;L</i>	Introduction to Controller Area Networks <i>CA</i>	Data Filtering using the Motorola DSP560xx Family <i>Motorola</i>	Reserved (Subject TBA)
11:00 to 12:30		Logic Doubling with Atmel's AT15XX CPLDs <i>Atmel</i>		Selecting Processors for DSP Applications <i>Berkley Design</i>	Designing with an ARM7TDMI-based Configurable SoC <i>Unisys</i>			Embedded Interworking for 8-Bit uCs: CAN <i>K&amp;L</i>	Intermediate CAN and CANopen Programming with Philips CAN Controllers (with K&L C21 Compiler & Philips H24) <i>Philips</i>	CodeWarrior for Motorola's StarCore <i>Motorola</i>	Developing Complete AVR Applications using the STX800 <i>Atmel</i>
1:00 to 2:30		Fast, Economical Connectivity Design <i>Viscom</i>	8051 SoCs in Mixed Signal Designs <i>Copall</i>	SuperH for Personal Information Electronics <i>Hitachi</i>	Dev. & Debugging of SW for ARM-based ASSP & SoC Devices <i>UP</i>			Low EMI COTS Hardware Design <i>Philips</i>	8051 SoCs in Mixed Signal Designs: IDEs & Dev. Systems <i>Copall</i>	Reserved (Subject TBA)	Logic Doubling with Atmel's AT15XX CPLDs <i>Atmel</i>
3:00 to 4:30		Configurable DSP Core and SoC Design <i>SDP</i>	Speeding the Dev. of Networked Devices: Techniques for Designing with SoCs <i>NEC/Sony</i>	Embedded Interworking: C156 Solutions <i>Philips</i>	Reserved (Subject TBA)				Embedded Interworking with Philips Microcontrollers <i>Philips</i>	SuperH for Personal Information Electronics <i>Hitachi</i>	ARM Software Workshop <i>ARM</i>
5:00 to 6:30		DSP System Design Examples for VOP & Audio <i>SDP</i>	Embedded Java to Develop Intelligent Network Elements <i>Motorola</i>	LINUX Web Server on an Embedded PowerPC System <i>TD Components</i>	Reserved (Subject TBA)	"Embedded for Dummies" Part 2 <i>Jim Torley, AEC</i>		Debugging the C166/5112 with JtestView56/win <i>PLS</i>		Reserved (Subject TBA)	RTOS-Aware Debugging of SW for ARM Systems <i>EP</i>
Friday June 1	Tutorial Room N1 501	Tutorial Room N1 401	Tutorial Room N2 401	Tutorial Room N2 501	Tutorial Room E1 603	Lecture Series Sorenson Hall	Lab Room E2 302	Lab Room E2 501	Lab Room E2 401	Lab Room E2 303	Lab Room E2 502
9:00 to 10:30	Become a IEEE-1394 Expert for Embedded Systems: Part 2 "1394 Protocol and Interface" "Control & State Registers (CSR)" "1394 ROM Structure" "Synchronization and Asynchronous Transfers" "1394 Bus Initialization" "1394 Initiator/Target" "1394 Initiator/Target" "1394 Initiator/Target" "1394 Initiator/Target" <i>MicroDesign Resources</i>	Nucleus-Your Complete StrongARM Solution <i>Accelerated Technology</i>	ARM-based Technology: An Introduction and Update on New Developments, including ASISA <i>ARM</i>	CAN & CANopen Solutions using 8-Bit Microcontrollers <i>Infineon</i>	Adding a QVGA LCD Graphics Controller to an 8051 <i>Unisys</i>	Implementations of the MIPS Architecture <i>Unisys</i>	USB Workshop Embedded Host: Driving USB 2.0 Beyond the PC "Scheduling" "Handling Multiple Endpoints" "Multiple Device Systems" "Different Transaction Types" Also: System Architecture and Partitioning Issues <i>Cypress Semiconductor</i>	Embedded Interworking for 16-Bit uCs: CAN, TCP/IP & Ethernet <i>K&amp;L &amp; Philips</i>	Intermediate CAN and CANopen Programming with Philips CAN Controllers (with Reference S11A Compiler, Philips H24) <i>Philips</i>	Reserved (Subject TBA)	Reserved (Subject TBA)
11:00 to 12:30		How to Create a 3D MIPS Programmable SoC <i>Atmel</i>		Info. Appliance & Embedded Internet Solutions <i>ARM</i>	Designing with an ARM7TDMI-based Configurable SoC <i>Unisys</i>	Introduction to ETRAG On-Chip Debug <i>Unisys</i>			ARM Software Workshop <i>ARM</i>	Reserved (Subject TBA)	Nucleus-Your Complete StrongARM Solution <i>Accelerated Technology</i>
1:00 to 2:30		Hardware Cryptographic Security in PCs-TCPS <i>Atmel</i>	codellab-Deconstruct Your Time To Productivity <i>Accelerated Technology</i>	Connect to the Embedded World with PowerPC <i>TD Components</i>	Dev. and Debugging of SW for ARM-based Sys. with Triscend A7 <i>EP</i>	Developing Software for the MIPS Architecture <i>Unisys</i>			Performance Upgrade your 8051: Migrating from the 8051 to the 16-Bit KA with the Same Compiler (with Reference S11A and Philips KA-640 Rapid Dev. Kit) <i>Philips</i>	Embedded Internet Solutions using AM100XX <i>ARM</i>	Creating a SoC with FPGAs, AVR, & Mentor Co-Verification Tools <i>Atmel</i>
3:00 to 4:30		Reserved (Subject TBA)	Speeding the Dev. of Networked Devices: Techniques for Designing with SoCs <i>NEC/Sony</i>	Reserved (Subject TBA)	Reserved (Subject TBA)	Developing and Debugging Software for the LARA Architecture <i>Unisys</i>		Debugging the C166/5112 with JtestView56/win <i>PLS</i>	Information Appliance Solutions using Elan SC528 <i>ARM</i>		SW and HDW Debug Environ. for ARM and MIPS <i>EP</i>

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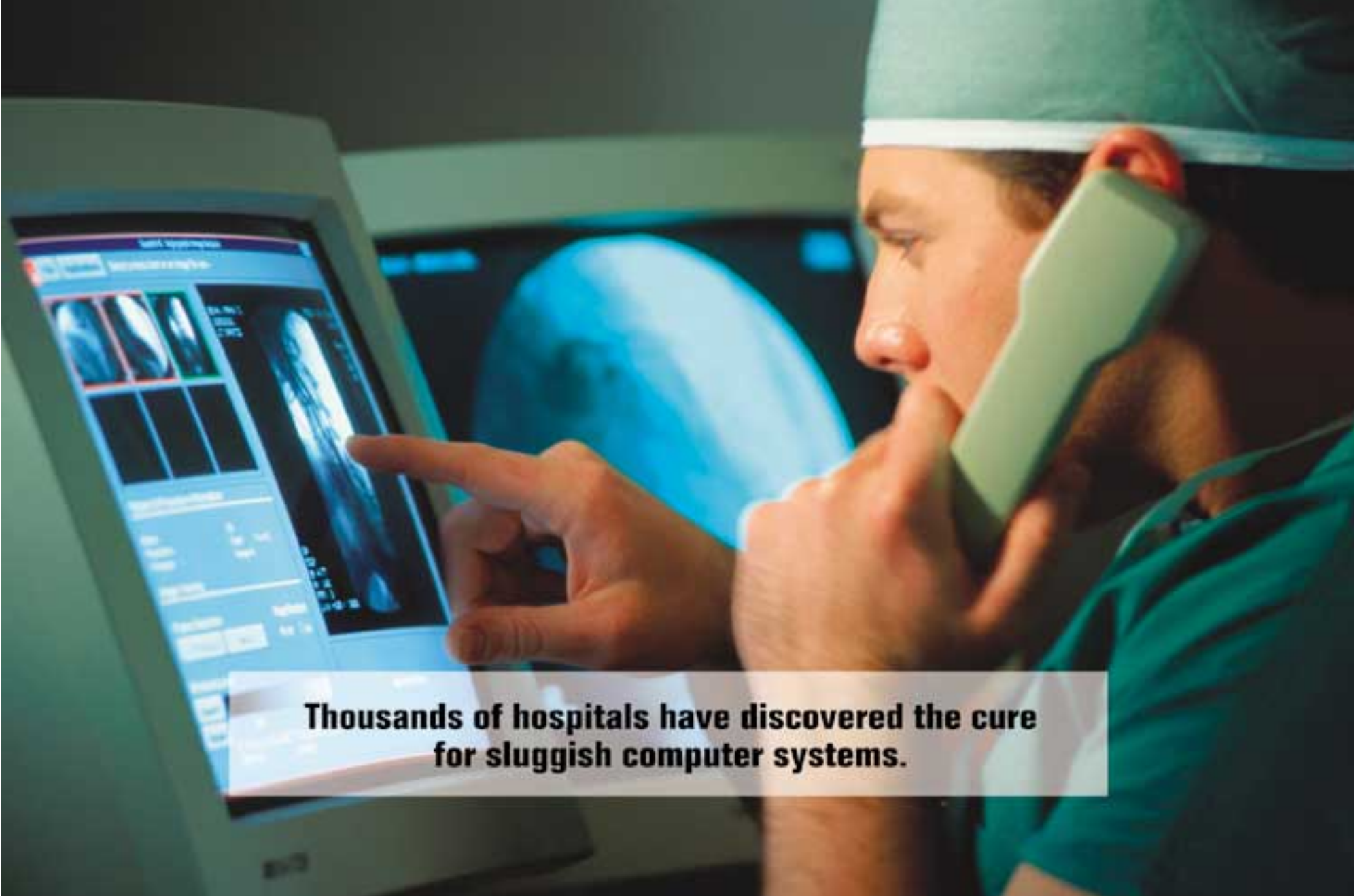


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# The Match Game

As object-oriented development proliferates, mapping tools breathe new life into relational databases

BY JENNIFER DEJONG

**W**hat happens when the application you're writing speaks Java but the database you need it to talk to speaks SQL?

You get what programmers like to call "impedance mismatch."

The term is borrowed from electrical engineering, but it accurately describes the problem that arises when you need to map objects used in a program you are developing to tables stored in a relational database. Because the structure of the application does not match the structure of the database, one side cannot talk directly to the other, said Doug Barry, principal at Barry & Associates Inc., a consulting firm in the Minneapolis area.

Relational databases house information in multiple tables, each containing information organized in rows and columns. All of the information is stored at the same level. By contrast, object-oriented languages, such as Java and C++, have their objects organized hierarchically in many layers of classes. "The challenge for the developer is to hook the hierarchical structure of an object-oriented programming language into a flat data model," said Soumitro Tagore

of Informix Software, the technical lead for its Object Translator mapping tool.

One way to map objects into a flat data model is to use an object-relational mapping tool. Designed to work with the major relational databases, these GUI-based programs have gained popularity in the past few months. They generate mappings between the database and business objects. Essentially translators that "normalize" data, they describe objects as a single entity that can be stored in a relational database's rows and columns.

A mapping tool allows you to establish the rules you want your application to follow—for example, defining that a specific class of objects is mapped to a specific set of relational tables. It then saves those rules, effectively automating a process that you would otherwise need to code by hand. "You specify, this is my database. These are my objects, and this is how I want them saved," explained Enrique Travieso, chief architect at Objectmatter Inc. The company makes a mapping tool called Visual Business Sight Framework.

Not only do O-R mapping tools automate a tedious and repetitive process, they can also provide performance

improvements, such as caching, said Barry. He and others noted that O-R mapping tools have been around since the early 1990s and were used chiefly by C++ programmers. "But they used to be an arcane thing hidden away in computer science," said Tagore.

What's giving O-R mapping tools new life now is Java. As it matures, it is becoming the programming language of choice for an increasing number of developers. Not only are more and more programmers using it for larger projects, they also are taking advantage of its true "object-orientedness," in increasingly sophisticated ways, said Carl Olofson, a group director at research firm IDC. "They are seeing the enormous advantages of object-oriented languages over procedural programming," he said, emphasizing its ability to easily maintain and update applications over the long haul.

O-R mapping is an issue for all object-oriented programmers working with relational databases, not just those developing in Java, said Greg Cornellier, vice president of engineering at Ontos Inc. But because Java forces an object-oriented approach, O-R mapping tends to focus on Java, he said. "I believe more and more developers using the Microsoft object-oriented development environments are running into this issue as well," he added. The company's mapping tool, ObjectSpark, supports COM data components as well as Java beans.

## SAVE TIME AND MONEY

Why opt for an O-R mapping tool at all? You could, of course, write lots and lots of Java Database Connectivity (JDBC) code by hand. But nobody believes that's a good idea. First, the process is time-consuming and prone to error. Second, said Informix's Tagore, that kind of nitty-gritty programming—writing JDBC code—is not something object-oriented programmers are particularly good at.

Using a relational mapping tool reduces time-to-market and it makes it much easier to maintain the application in the long run. "Unless you are totally masochistic, most of us want to go home at night," said Tagore. He added that because it can maintain code someone else wrote, a mapping tool also preserves the company's investment in the technology.

"There is no question that if you are in a situation where you need to map, it's better to buy a tool," said Barry. "If you map by hand, [those mappings] take up some 30 to 40 percent of your code." That results in slower performance—not to mention, the more lines of code you write, the more errors you can make, he added.

Although no one appears to have quantified the cost savings, vendors offered some anecdotal evidence. Tagore estimated that coding by hand might take from six to nine months. He said that an Informix customer in the health-



## Object-Relational Mapping: Handy Tools of the Trade

A decade or so after C++ programming gave rise to object-relational-database mapping tools, the product category is enjoying newfound popularity, but now it's Java, not C++, that is driving the market. By easing the process of getting Java applications to talk to relational databases, O-R tools are helping enterprise developers bring Web applications to market faster, sparing them the tedious, error-prone task of coding the mappings by hand.

Although the O-R mapping tools are not difficult to use—they generally have



**Poor mapping choices can slow performance, says Barry.**

drag-and-drop interfaces, which some vendors say are suitable even for nontechnical professionals—consultants emphasize that object-relational mapping is not a trivial task. There is a considerable amount of skill involved in establishing the rules you want your application to follow, said Doug Barry, principal at Barry & Associates Inc. "There is more than one option when it comes to how to map."

And while there is no question that using the tools is a far better option than coding by hand, Barry emphasized that

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**O-R mapping tools were considered arcane, says Informix's Tagore.**

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## MAPPING

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the mapping decisions you make matter because poor choices can significantly slow performance.

From small companies where the O-R tool is the sole product, to better-known firms that sell a variety of database and/or e-business products, a range

of players populate the object-relational mapping space. Here's a look at some of them out there.

### Informix Software: Object Translator

[www.informix.com/informix/products/tools/objecttrans](http://www.informix.com/informix/products/tools/objecttrans)

Object Translator is Informix's solution for mapping objects to relational data models. The product works with all of the

relational databases, though the company admits Object Translator is optimized for use with the Informix database.

Object Translator automatically generates mappings between the objects in business applications and the data in relational databases. And unlike many of the tools that focus exclusively on O-R mapping, it also supports XML, generating code that manages the movement of

XML data to and from relational databases to the Internet.

### Objectmatter Inc.: The Visual Business Sight Framework (VBSF)

[www.objectmatter.com](http://www.objectmatter.com)

Objectmatter is a small company and VBSF is its sole product. The object-relational Java framework allows Java objects to be easily saved and retrieved from relational databases. Written in Java, it supports any relational database that can be accessed through a JDBC driver.

### Ontos Inc.: ObjectSpark

[www.objectspark.com](http://www.objectspark.com)

ObjectSpark is Ontos' answer to the object-relational mapping problem. The company claims its product is the only one that supports both COM data components and Java beans. Ontos offers consulting services around its O-R product and also helps companies in the insurance business develop e-business applications.

### WebGain Inc.: TopLink

[www.webgain.com/products/toplink](http://www.webgain.com/products/toplink)

Best known for its VisualCafé, WebGain sells a wide range of e-business development tools, including an object-relational mapping product called TopLink. TopLink foundation libraries are available for Java, BEA's WebLogic Server and IBM's WebSphere.

### Thought Inc.: CocoBase Enterprise O-R

[www.thoughtinc.com](http://www.thoughtinc.com)

CocoBase is Thought's offering in the object-relational mapping space. The company says the product supports the leading application servers, including BEA's WebLogic, IBM's WebSphere and those from Bluestone, Borland, GemStone and iPlanet, among others.

### Great Bridge LLC: An Open Source Alternative

[www.greatbridge.com](http://www.greatbridge.com)

Great Bridge doesn't sell an object-relational mapping tool, but instead offers consulting services around the open-source object database PostgreSQL. It also distributes the database to customers free of charge.

The company, formed in May 2000, insists that the potential cost savings will drive customers. Because it eliminates the enormous cost of licensing software from the relational-database makers, the customer ends up with a feature-rich solution at a better price, said Mark Cotton, Great Bridge's vice president of consulting services.

How will Great Bridge get IT shops—heavily invested and culturally entrenched in Oracle, DB2 or SQLServer—to make the move? “One department at a time,” said Cotton. “We do a test run—and demonstrate the savings,” he said. “We hope to do for PostgreSQL what Red Hat has done for Linux.”

—Jennifer deJong

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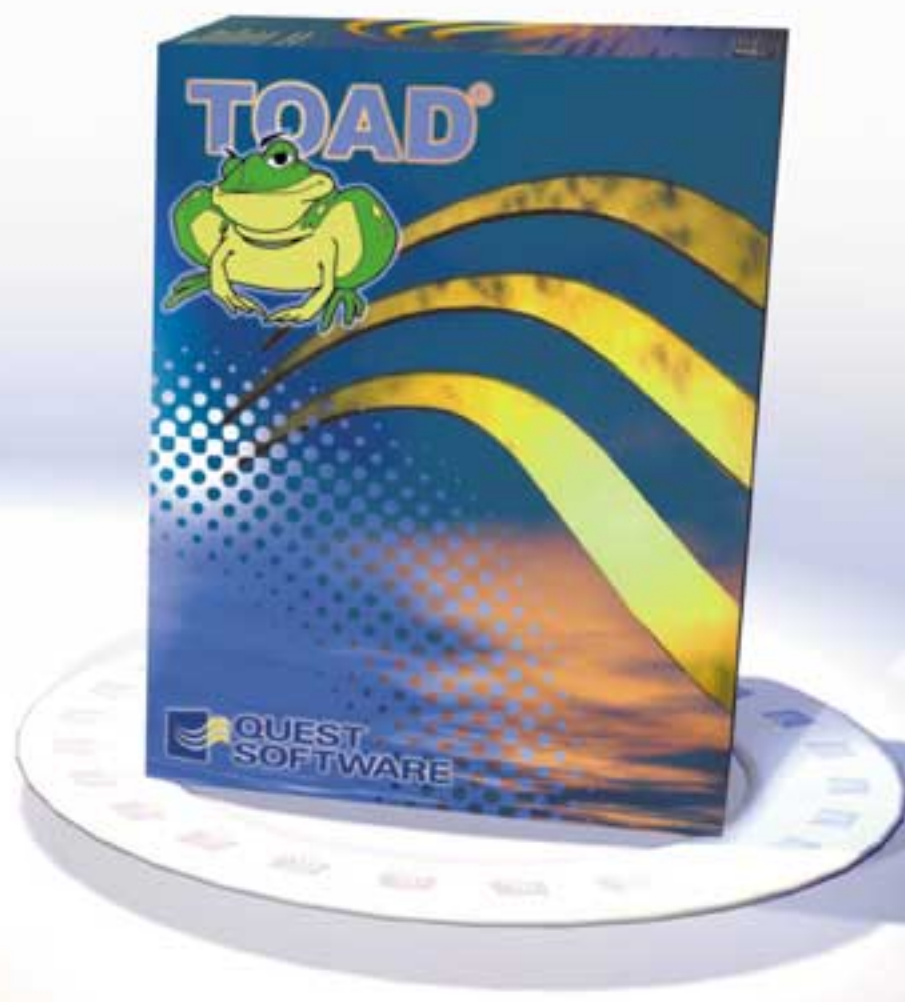
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## MATCH GAME

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care sector was able create a Java application in four weeks using the company's mapping tool, Object Translator.

"I can certainly code this by hand," said Ontos' Cornellier. "But it will take me an awfully long time. If you have 100 classes, it will take you weeks, instead of days." He said ObjectSpark, which costs \$1,800 for the professional version, could pay for itself in two days. "That's what a couple of days of consulting would cost you," he said.

"I have [written applications] both ways," echoed Objectmatter's Travieso. "And the mapping tool is a huge time saver. Once the mappings are defined, that's it, you are done," he said.

### WHAT ABOUT OBJECT DATABASES?

Of course, all this raises a question: If relational databases can't store objects, why use them in the first place? The answer is simple. "More than 90 percent of existing data is housed in relational databases," said Cornellier.

If you work in an IT department and you have all this existing relational data, you will need to map your [Java application] to the relational database, and then map it back again, said Barry. "The decision is as much political as anything else," he added.

But when you are working without that constraint of existing data, an object database is a better alternative, eliminating the need for mapping, claimed Barry. "An object database can run 100 to 1,000 times faster, depending on the data. When you have to map [objects to a relational database], you take a big performance hit," he noted.

If a database's sole purpose is to act purely as a database for an application you are writing, an object database can make sense, agreed IDC's Olofson. But he noted that object databases never have gained significant market share and he does not expect them to do so. "The OO paradigm is hard for end users [who query a database] to grasp—it is abstract," he said.

He noted that the major relational-database manufacturers, such as IBM, Informix, Microsoft and Oracle, are all adding object capabilities to their products, though he said that none of them is full featured enough that you can save directly from Java to the relational database.

"Essentially, they are extending the vocabulary of SQL to deal with special data," he said. "Oracle has added objects such as table objects and column objects," he noted. And although Informix comes perhaps closest—it has the ability to support inheritance—to date, there is really no such thing as an object-relational database.

### BRIDGING THE GAP

Vendors of O-R mapping tools, and consultants who work them, say the

tools not only ease an arduous programming task, they also perform an important cultural function in the corporate workplace: They bridge the gap between business and technical users.

"Business people and tech people just don't think the same way," said Mark Cotton, vice president of consulting services at Great Bridge LLC, which provides object-relational map-

ping services around the open-source database PostgreSQL. "You need a go-between for the two groups," he said.

When a business analyst sits down with a programmer to explain what is needed in an application, he might say: I want a product that pulls together all the financial services we offer customers. "The business analyst is thinking about mortgage rates, college loans

and where all that fits into the customer's portfolio," said Cotton.

But the programmer can't help jumping ahead, thinking: How can I structure the data? The mapping tools allow the programmer to stop and listen and to focus on the business problem, instead of worrying about how to get the application to work the database, he said. ■

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Maybe it was more fun when she was a systems analyst, but now that she's responsible for a team of 30 application developers, she's jazzed about being on the executive team leading the company's migration to the dot-com business model. Sure would be nice if there were more qualified Java programmers on staff, but finding experts in J2EE isn't easy. It's a good thing she's given up sleep.

The developer journals? She doesn't need to learn how to code more efficient Perl or understand the syntax of XSL. She needs a wide-angle view of the entire spectrum of applications and software development. All languages, all platforms. Vendor roadmaps, not how-to tips and tricks. She needs to know the news, the trends, the products, the alliances, and what they all mean. That's why she reads *SD Times*.

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# VoiceXML Is Calling

## New telephony products access Web using XML

BY DOUGLAS FINLAY

Introducing VoiceXML, a recent derivation of the Extensible Markup Language that could standardize the interfaces between the Web and speech-enabled applications to allow retrieval and recital of data from databases through a telephone.

No fewer than three companies, BeVocal Inc., General Magic Inc. and HeyAnita Inc., have introduced voice-management products that incorporate the fledgling VoiceXML 1.0 standard to help developers reduce coding time for speech applications that access databases.

"With users attempting to send e-mails over their cell phones when a call would do, I think it proves that WAP [Wireless Application Protocol] devices aren't really working, and that developers are simply trying to shovel a lot of technology and functionality into a device that is designed only for speaking, as phones are," said Saeed Khan, General Magic's director of product management. General Magic ([www.generalmagic.com](http://www.generalmagic.com)) has introduced the MagicTalk Voice Gateway, a development environment for creating VoiceXML applications. "VoiceXML is one rendering of XML that is specific to voice- or speech-based applications," he said, and provides tags for creating those applications.

"When you create a speech-based application, you need to do things with the speech, such

as emphasize it rather than bold it as you would with text, so there is a tag for emphasizing that speech," he continued. "Or maybe we need to read an e-mail to someone, so there is a tag called <say as> where the e-mail text is passed to. A speech-recognition engine renders the speech to vocalize the message," he said.

He said the logic of the application could be written in Java or C++ and generated as VoiceXML tags for presentation of voice. He said that when developers build voice applications, they will want a choice of speech-recognition engines available on the market, and depending on need will pick the appropriate engine. "MagicTalk Voice Gateway doesn't provide a speech-recognition engine, but the interface that allows any third-party software engine to interface to it, as well as any telephony hardware," he said.

Calling MagicTalk an open platform for building and deploying speech-based applications, he also said it provides integration of VoiceXML, telephony services, media and speech recognition. He said that when a call comes into a gateway requesting data, the call is identified with an application, which makes a connection between the phone and the application. The application will then respond with a "Hello" to start executing the application. It may then request other information, recognize the

speech and send that information to the application for processing. The data comes back to be spoken to the requestor.

MagicTalk Voice Gateway also features extension APIs for adding custom tags, and an interactive VoiceXML debugger. Pricing is \$3,000 per developer seat.

Meanwhile, HeyAnita's FreeSpeech Platform consists of a VoiceXML browser, an application server and a Web site for developers to procure free voice tags and other documents pertaining to VoiceXML (<http://freespeech.heyanita.com>). The platform enables developers to write voice applications once in Java, C++ or any familiar programming language and deploy them many times. "The application server translates any language into VoiceXML tags, and sends information to the VoiceXML browser to interpret the requests and send them to the proper application," said Sanjeev Kuwadekar, the company's CEO.

Like the MagicTalk Voice Gateway, the FreeSpeech Platform manages the interoperation of telephony hardware, voice applications and speech-recognition engines. The platform will be available in May.

BeVocal's BeVocal Café is another development platform for developing voice applications using the VoiceXML 1.0 standard. "Before VoiceXML, developers had to do a lot of code writing and know voice-recognition technology specifically," said Bryan Michael, BeVocal's ([www.bevocal.com](http://www.bevocal.com)) director of enterprise solutions. He said the advent of VoiceXML would encourage less sophisticated developers to write speech applications.

Michael said BeVocal Café had implemented most of the 47 tags in VoiceXML 1.0, but the working draft of VoiceXML 2.0 would add some new tags by merging them with others for efficiency.

Michael also said that VoiceXML would not replace the WAP interface for mobile devices. Instead, he said, it would provide developers with more choices in presenting information to the enterprise, and work alongside WAP. ■

## News Briefs

### MORE PRODUCTS

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olds that monitor system hardware and events; it can also be configured to monitor ICA Browser and Terminal Server services . . . AbriaSoft's new **Abria Merlin Server** is an open-source Web development and production platform providing open-source tools such as MySQL, Apache, PHP4, Perl and Perl DBI. The new server includes a graphical development environment, a template-based Web portal and news system, and an automated SSL certificate generation wizard . . . HP Bluestone has announced that its **Total-e-Server** application server, which is claimed to bridge the gap between HP's J2EE solutions and Microsoft's .NET platform, now supports SOAP to enable cross-communication between applications written in either environment . . . TechExcel Inc. has released **DevTrack 4.1** with such new features as full-field searching and reporting capabilities and support for Informix database servers. It is available now for Windows NT/2000 . . . Microsoft Corp. has announced an updated version of its **SOAP Toolkit**, 2.0, for the Visual Studio 6.0 development system, which will allow developers to build XML-based Web services and will provide full support for SOAP 1.1 and the Web Services Description Language (WSDL). It will also add capabilities to any existing application that supports the Component Object Model (COM).



### PEOPLE

NTRU, a provider of public key security for wireless markets, has named **William Whyte** as director of cryptographic research and development. Whyte joins from Baltimore Technologies, where he was chief cryptographer . . . **Anders Hejlsberg** is recipient of the 2001 Excellence in Programming Award, chosen by editors of CMP Media Inc.'s Dr. Dobbs' Journal. Hejlsberg, who currently works as an engineer at Microsoft Corp., was the author of Borland's Turbo Pascal and chief architect of Delphi and later Microsoft's Visual J++. Hejlsberg is currently designing the C# programming language . . . Rose City Software, a division of InfiniSource Inc., has appointed **Paul Mayer** as vice



president of software development. He comes from the Microsoft Network Online Forum where he served as a forum manager . . . **Robert Dickerson** has been appointed Pacific Edge Software Inc.'s president and CEO. Dickerson was formerly senior vice president and general manager at Rational Software Corp. . . . **Peter Kestenbaum**, the former vice president of corporate marketing at Agency.com, has recently joined Passlogix as the vice president of business development for its v-GO Exchange platform . . . The Chemical Industry Data Exchange (CIDX) has announced **Patricia Simmons** as its new executive director. She previously worked at Dow Chemical Co. as the director of e-business strategy and program management . . . **Alan Shoap** is the new vice president and general manager of Borland Software Corp.'s enterprise business unit, which encompasses AppServer and VisiBroker. Previously, he served as the vice president of products at iSharp Corp. . . . **John DiFerdinando** is Artisan Software Tools Inc.'s new vice president of worldwide marketing. He was formerly with Preview Systems and Summit Design . . . With more than 25 years of high-technology experience, **Bob Kruger**, formerly of Microsoft Corp. and BMC Software, has been appointed vice president and CTO of Citrix Systems Inc. . . . Green Hills Software Inc. has named **Peter H. Foley** as CFO . . . EarthWeb Inc. has announced that **Scot W. Melland** will be taking over as president and CEO—positions previously held by **Peter A. Derow**, who has been named vice chairman of the board.

### STANDARDS

The Mortgage Industry Standards Maintenance Organization has released **XML Data Standards version 1.1**, which covers secondary pooling and delivery transactions as well as credit, underwriting, mortgage insurance application and service request processes . . . The Object Management Group and insurance industry standards group ACORD will work together to present the ACORD data model in the **Unified Modeling Language**, so that when OMG issues RFPs from the insurance industry, the ACORD model will be used where applicable. ■

## A VOICEXML PRIMER

The Voice Extensible Markup Language 1.0 specification (VoiceXML, or VMXL, 1.0) was developed by the VoiceXML Forum ([www.voicexmlforum.org](http://www.voicexmlforum.org)) to help promote accessibility of Web applications and data using the telephone and speech-enabled applications written in a standard tag language similar to HTML. The Forum was founded by AT&T Corp., IBM Corp., Lucent Technologies Inc. and Motorola Corp.

Janet Daly, spokesperson for the W3C, said the Forum group has submitted a letter to the W3C with the stated purpose of making the VoiceXML

1.0 specification one component part of the seven component parts that will make up the W3C's Speech Interface Framework, currently under study by the Voice Browser Working Group.

In its simplest form, VoiceXML tags are designed to enable audio files to be played that recite information stored in an application on a database, and VoiceXML 1.0 standardizes the interfaces to those applications from a VoiceXML browser, which interprets tags and sends the requests to the appropriate databases. —Douglas Finlay



## CURL

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oriented sense, you need to be an accomplished C++ or Java programmer," he said. "But if you're an HTML programmer, you can do as much with Curl as you're doing now."

Underpinning the Web expe-

rience, Batty said, is industrywide adoption of standards such as SOAP, XML and UDDI—but even there, compliance with those standards isn't perfect and that can create difficulties. For example, Microsoft's SOAP, he claimed, is somewhat different from Apache's SOAP. "The success of Web services demands a

very clean public API," Batty said, "so different objects from different vendors can talk. If not, it's a waste of time and we're back to EDI. But there's a tremendous amount of momentum for the requirement of interoperability." Implementations of current Web standards can be created in the Curl environment now, he said.

The Curl project began in 1995 at MIT to identify a software substrate to the hardware substrate known as the Internet, Batty said. The project allowed researchers to assume the Web did not exist and to throw out existing notions of how things work. In 1998, when the decision was made to embrace and

extend existing technology, Curl was spun out of MIT into a private corporation, bringing with it Dr. Michael Dertouzos, the director of the MIT lab for computer science; Dr. Steven Ward, who with Dertouzos was behind the original Curl project; and Timothy Berners-Lee, who essentially invented the Web and is the director of the W3C.

Curl's marketing plans are to go after vertical markets, Batty said. Curl will play best in the entertainment industry, which relies on graphics; the financial services sector, with its charting and calculations performed on the client; the publishing industry, with its hyperlinks for interactivity; content aggregators, which create transactions that now suffer from time delays; and the travel and hospitality industry, which generates online ordering and ticketing. It is in these areas, he said, that Curl's client-side architecture will show increased performance and a better Web experience. Messages are sent between the client and server, without the page having to be rebuilt every time something else is clicked on, Batty said. The compiled page or package sits in a cache on the client, as the interface is separated from the data, providing what Batty called an "order of magnitude increase in performance."

Users will be able to personalize their Web experiences because they're all being compiled at runtime, with the compiled information cached on the client to reduce the number and size of messages crossing the Internet, Batty said. For instance, a user could link a Yahoo mail server to Amazon's technical publications section to an airline tickets site to create a custom experience. "You get what you want instead of what a Webmaster wants you to see," Batty said.

Curl signed an agreement with CollabNet to serve as the third-party administrator for the open-source code, Batty said, allowing developers to incorporate features they want without having to wait for Curl to build the feature into a future release.

The first release of Curl was for Windows 9x/Me and Windows NT/2000, with Windows XP being tested now. Versions for MacOS X and Linux are expected later this year. Curl supports all major browsers, Batty said. Surge 1.0 is licensed to commercial Web sites and billed on a metered basis; there is no charge for individual users. ■

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## BORLAND

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dynamic XML binding capabilities, he said, which can give programmers the ability to build flexible Web services that can service a variety of trading partners. BizSnap also will natively support WSDL and XSL Web services protocols, as well as DTDs and XML schemas.

In addition to building stand-alone applications and services, BizSnap will allow multiple services to be aggregated into a single service or application, regardless of the source of those services, Swindell said. As an example, he described a travel agency portal that might be an aggregate of the ticketing services offered by an airline, car rental services of a rental company and room-booking services of a hotel chain.

But there's a catch. This type of application building requires that all the aggregated services are XML-based and contracted, meaning that they conform to Web services standards of behavior governed by the W3C—something that Swindell believes is generally safe to assume. "Today a lot of time is being spent to standardize these protocols, and we are focused on supporting all service standards, not just .NET or Sun One," he said.

### IT'S A SNAP

Also new with Delphi 6.0 will be WebSnap, a Web page designer that Swindell said will simplify the job of building and debugging Web applications and "bring Web development to a greater audience," which he said may now include nontechnical Web development shops. Page design will be simplified, he said, because VBScript and JavaScript functions can be separated from the actual interface design. The look and feel can be designed by nontechnical people through Surface Designer, a new HTML/JavaScript UI module that can integrate with Macromedia's Dreamweaver or Microsoft's FrontPage HTML editors, Swindell said.

Also new with WebSnap will be server scripting, including support for ActiveScript and JavaScript out of the box, and support for Perl, Python and others to be added. Further, Web application debugging will be improved with the addition of an integrated Web server, which saves time, according to Thomas Theobald, a RAD tools

product manager, because it "prevents developers from having to run a separate server on a local machine for testing." This way, most of the problems that a developer would ever run into can be solved before deployment, added Swindell.

With Delphi 6.0, Borland's MIDAS middleware develop-

ment framework will be replaced by DataSnap, a Web services-enabled middleware environment for building database access. According to Swindell, DataSnap developers will be able to build middleware for accessing virtually all commercial databases and interoperate with applica-

tions through SOAP/XML, TCP/IP, DCOM and CORBA. According to the company, the tools also will enable databases of any enterprise RDBMS to be Web services enabled and published via XML and SOAP. It also will enable developers to build MIDAS-compatible n-tier middleware services sup-

porting GUI, Web-browser and Web services clients, with client connection pooling capabilities.

Finally, developers using Borland's recently released Kylix RAD environment for Linux can port to Windows through a complete CLX component library that will be common to both Delphi and Kylix. ■



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## EDITORIALS

## New Life for Berkeley Unix

The pending acquisition of the BSD operating system by embedded software giant Wind River Systems Inc. represents the end of an era.

The venerable Berkeley Standard Distribution is revered by Unix enthusiasts, and is also where many Linux hackers first learned vi and grep as computer-science students; as developers, they likely used either BSD OS or one of its many derivatives. BSD has been proud of its genuine Unix heritage. Unlike Linux, which was designed as a clone of Unix, BSD OS is the real McCoy, and loyalists are understandably angered when they hear their beloved platform inaccurately portrayed as "just another Linux distribution."

But what do you expect from an operating system whose parent company, Berkeley Software Design Inc., so heavily promoted it at LinuxWorld?

What exactly will Wind River do with BSD OS? The company has promised to continue supporting the open-source FreeBSD project, and indicates that BSD OS will become the basis of Internet appliances. Embedded Linux customers will flock to BSD, says Wind River, because its open-source licenses are more business-friendly than Linux's GNU Public License. Wind River may be right; many companies wish to embrace and extend the operating system and its applications while maintaining those improvements as proprietary intellectual property.

Two questions remain. Will Wind River use its first mainstream operating system to expand its business beyond the traditional embedded market? And will open-source supporters, who proudly sported their BSD devil-horn hats at industry events, remain as fervently committed to BSD OS when its flag transfers from a small, privately held business to a large, publicly held giant?

## Object Databases, Relational Databases

It has been estimated that more than 90 percent of data is stored in traditional relational databases. Fair enough: Many, if not most, of those systems, are based on procedural languages like COBOL. Yet as more and more new applications are developed using object-oriented languages such as C++ and Java, developers are still forcing their data into the rows and columns of an RDBMS.

Why aren't they instead flocking toward the new breed of object databases? Good question. Perhaps it's because RDBMS technology is well understood. Maybe it's because users and administrators are comfortable interacting with a database using SQL. No matter: Corporations haven't flocked to object databases so far, and relational databases are likely to remain king of the hill, at least for the foreseeable future.

That's not entirely bad news (except for the object-database vendors, of course). O-R mapping tools help developers shoehorn objects into rows and columns. It's not perfect, but it works. Increasingly, the mainstream RDBMS vendors are also adding O-R capabilities to their flagship database software. While this is a far cry from true object-oriented data storage, it's a step in the right direction.

Object databases never made it big as a mainstream technology, but as the market begins to ponder the implications of pure XML-based databases, there are lessons that might be learned. But considering the inertia of the RDBMS manufacturers, maybe not. ■

## GUEST VIEW

## OPEN STANDARDS—THE ONLY OPTION

Remember Al Gore once joked to David Letterman, "I invented the Internet, and I can take it away"? While proprietary software systems may not be quite so severe in their threatened effect, they can hinder the growth of the Internet. Fortunately, open standards allow people to integrate business processes from all over the world, build best-of-breed systems and communicate with confidence with users of other systems, to the degree that they do not even have to think about it.

Those who support the open-standards philosophy believe it is best to cooperate on technical standards and compete on implementation. It is a simple yet profound formula that has worked spectacularly well for numerous other industries throughout the industrialized age, including railroads, telecommunications, consumer electronics and utilities such as gas, electricity and water. Unfortunately, not all technology companies believe that open standards are the way to go with Internet technologies.

The Internet, almost by definition, is an integrated collection of open standards, and its benefits should be as accessible as possible. It is crucial that it not become a battleground for competing proprietary standards.

Take Web services. They represent the confluence of technology and adherence to open standards that will enable business success.

Web services are self-describing, self-contained, modular applications that can be mixed and matched with other Web services to create innovative processes and value chains. They can be accessed in asynchronous and synchronous modes (online and offline), through any client device (PCs, cell phones, handheld computers and so on). Web services can communicate with each other and are knowledgeable about their functions and roles in an application work flow, including inputs they require, outputs and their presentation format.

Using Web services, firms will be able to routinely publish services, access them and invoke them without being aware of who the service requester is or who the provider is beforehand. This will allow businesses to

focus on their core competencies and outsource all other essential, noncore activities at runtime. Business structures will be altered, and traditional models of creating and sustaining competitive advantages will be redefined. Users who need innovative solutions to enhance their competitive edge will be able to do so without having to worry about integration with existing systems and support for their business processes.

Increasing use of object-oriented programming languages, such as Java, has enabled the encapsulation of software applications into objects that contain greater functionality and support for business processes, and can be deployed across a network. Numbers of devices that are connected to the Internet are growing exponentially, and computational standards such as Linux, WAP and TCP/IP are being incorporated into these devices.

In addition, broadband and universal connectivity to the Internet are becoming commonplace.

Services such as Gnutella and Napster illuminate the possibilities of intelligent peer-to-peer networks that can facilitate greater collaborative computing scope. Use of open standards facilitates these networks that can create truly "end-to-end" connectivity.

The open standards world of HTML, Java and XML will now expand to integrate new open standards for Web services, including SOAP for communications, WSDL for describing the programmable interfaces, and UBR/UDDI as the repository for Web services. Users have become familiar with HTTP for Internet communications, HTML for navigating Internet applications, and URL/DNS for identifying Web sites and resolving their locations. Now applications will have a similar set of open standards, and the effect will be the acceleration of the e-business revolution. Combined, these trends create the convergence required for exploiting the Internet as a computing platform on which smarter software applications can enable e-business at electronic speeds.

The simple reality is that the full potential of the Internet will not be realized without agreement on technology standards. This becomes especially important as newer and easier ways to access the Net become available, like mobile Web-enabled phones and the billions of other handheld devices that will connect to the Net in the next few years. The incredible diversity of systems and standards that currently exist can make such connection difficult.

With Web services, each individual or business does not have to recreate the wheel, hand coding stock quotations, airline reservations and news streams. Using the Web as an extension of function, developers can discover and incorporate prewritten Web services with their existing applications to create and enhance business and customer e-business relationships.

Web services will have a wide-ranging impact on various businesses, their business models and the nature of their interaction with employees, customers, partners, suppliers and regulators.

To evolve into the next era of e-business, the Internet's infrastructure needs to be as open, flexible and adaptable as our modern-day telephone network. The way to do this is to adopt common technology standards for the Internet, starting with the software that provides intelligence for running complex systems.

Companies should not have to worry about whether their systems will work with one another or link to partners and suppliers. Software should provide the glue that makes everything work together. The integrating software—middleware—needs to run on all platforms, regardless of vendor, architecture and operating system, so that they are all connected. When that happens, the Internet will become a common ground for everyone who wants to use it. The Internet belongs to everyone, and its basic architecture should reflect this public purpose. ■



SCOTT  
HEBNER

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## A TALE OF TWO INTERVIEWS

Yesterday I went to two interviews, looking for my next gig. The first was in Oakland's city center, the second in San Francisco's financial district. At the end of the day, I was more confident than ever that the profound economic impact of the Internet age is only momentarily suppressed. New companies are still emerging, innovating and adapting, moving toward the market and laying the groundwork for enormous success. Meanwhile, older companies remain wasteful and inefficient dinosaurs, clinging to outmoded ways of doing business, and wrongly thinking that because they survived the meteor impact so far, they've avoided extinction.

Across from Oakland's City Hall is the Rotunda Building, with wrought-iron banisters on the stairways, slow elevators lined with batting to protect them from being scratched by freight, and the smell of fresh paint in the air. Around the rim of the rotunda on the second floor is the "Tech Cluster," consisting of very small offices with a shared receptionist, some doors unmarked, others sporting brand-new flashy logos.

With a grassy plaza in front, easy access to a bustling downtown area and beautiful interior spaces, the building puts to shame the converted warehouses of San Francisco's South of Market area, and I suspect that it

rents for no more than a couple of bucks per square foot. It was behind one of these doors that I met with Chris Manley and Tafawa Kesler, two of the founders of Aphiniti, a company still in stealth mode. The office is small, about the size of a large living room, with a half-dozen desks and a table about the right size for an intimate game of poker, a bookshelf of technical titles, a couple of Windows machines and a Solaris box.

Chris' first questions were: "What are you like? What are your drivers?" For two-and-a-half hours we talked about teams we'd seen succeed and fail, the balance between time-to-market and feature-richness, ideal team size, why they were focusing on one market rather than another, which technologies might provide crucial leverage, and which might add unnecessary complexity. By the time we wrapped things up, I knew that Chris and Tafawa were smart and knew their market, and that working with them would be enjoyable.

I headed over the Bay Bridge for my next interview. A headhunter had pitched me on a high-paying contract CTO/VP of Engineering position two towns from where I live—a 10-minute commute. Naturally, I was eager to speak with her. I parked in the

\$5.50-per-hour Embarcadero Center garage and walked over to the "A"-class office building. Even with the rents in San Francisco stabilizing and often dropping, financial-district rents typically exceed \$7 per square foot.

When the elevator pitched me out onto the vast 10th floor reception area, I couldn't help but ponder the ratio of rent to produced value between this company and Aphiniti. Two receptionists staffed the front desk, and after calling in to my contact to let her know I had arrived, one asked if I had filled out any paperwork yet. She handed me a couple of forms and directed me to a small conference

room that I suppose was the designated "filling out paperwork" room. The first form was labeled "Application for Employment"; the second was a skills checklist.

Turns out that the company was not a recruitment agency after all but a consulting firm, and apparently a successful one to pay for the marquee location. The sort of place that charges 5x multiples on the salaries they pay associates, the sort whose agenda is not to solve problems for their clients and engage, but rather to continually "upsell" services.

I idly filled in the relevant parts of the application; when the "headhunter" still hadn't arrived, I turned to the skills checklist. More nonsense: four pages of technologies, shrink-wrap pack-

ages and categories that had obviously accreted over the years with no regard for relevance. Although it was fun to check things such as Artificial Intelligence, Enterprise JavaBeans, ObjectVision, Pick/Basic and Quicken, by this time my distaste had turned to disdain. What was the purpose of this form?

The inclusion of modern technologies made it clear that it had recently been reprinted, but to what end and at what cost? If on the infinitesimal chance they got a call for an ObjectVision programmer, would they manually review the files? Or were they going to spend money to have the data entered or scanned into a database? All rather than having an intern spend a few days turning the list into a Web form?

After a lot more waiting, I ripped the forms up and walked out. I knew everything I needed to know about this company: They were inefficient, they clung to outmoded methods, and they were rude to potential clients.

I then spent an hour trying to find my car in the labyrinth of the Embarcadero Center's garage. That cost me an extra five bucks, but it didn't matter to me. I won't be going to San Francisco much any more; all the action is in Oakland. ■

*Larry O'Brien, the founding editor of Software Development Magazine, is a software engineering consultant based in San Francisco. Reach him at lobrien@email.com.*



WEB WATCH

LARRY O'BRIEN

## LETTERS TO THE EDITOR

### THE NEW FAD

I read with interest J.D. Hildebrand's commentary on open-source software development in the March 1 issue ("Does Open Source Still Matter," page 27).

Questioning the validity of open-source software development is both currently fashionable and desirable: As it is a New Thing without a lot of history behind it, it is only prudent and reasonable to wonder whether or not this is just another foundationless fad. But to lay the deflation of the dot-com hyperbole on the shoulders of open source, as he did, is absurd. The now-flaming dot-coms of last year were, almost overwhelmingly, completely divorced from any relationship whatsoever with open-source software development.

Was it a part of Pet.com's business plan to release its proprietary software systems as

open-source projects? Did DrugStore.com intend to build their business on a foundation of open-source development of their systems? No! Whether the dot-com boom lived or died had nothing to do with the open-source software development philosophy and methodology, and linking the two as he did makes as much sense as blaming an East-coast blizzard on an over-exuberant crowd at an Indiana high school basketball game.

In all honesty, J.D.'s next point eluded me only slightly. While it is arguable whether using Linux in place of Windows as a server operating system costs less, I don't know of many people who chose Linux on that basis. Judging from their published comments, most Linux adherents appear to choose it over Windows or another alternative because it works better,

not because it costs less. However, the point that the cost savings gained from using Linux over Windows will tend toward a minimum over time is well taken.

Linux is an example of open-source software, but open source is both broader and richer than Linux. Frankly, J.D.'s using a quarter of his column confusing the two did little more than convince me that the differences between open-source and closed-source software development have somehow escaped him. This impression was only reinforced by the tongue-in-cheek dig at the lateness of the Linux 2.4 kernel. The Linux 2.4 kernel was late, as pretty much all nontrivial software is late, because the open-source development philosophy favors usefulness over punctuality. That it was not released incomplete and filled with bugs in response to marketing imperatives is a strength of the open-

source software development methodology, not a weakness. Buggy software delivered on time may be good for the vendor, but it is not necessarily beneficial to the consumer.

I did happen to agree with the last portion of J.D.'s column: The very existence of open-source software is a tacit admission that the interests of software vendors and software consumers do not always coincide, and that the only effective defense that software consumers have of their interests is access to the source of their applications. Congratulations! You ended on a high note!

**Michael Sherck**  
Information Manager  
Geocel Corp.

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## OFF THE BEATEN PATH

In my last column, I discussed the fact that software development has changed profoundly during the past few years ("The New Face of Programming," April 15, page 37). And what's more, the changes have remained mostly undiscussed.

These changes derive from changes that have occurred in IT infrastructure. In the old days, processing was done either by a mainframe stoked by operators and system programmers, or by computing devices arrayed in a client/server architecture: clients talking to application servers talking to database servers. In both cases, mainframe and client/server, the developer was able to program the entire transaction path from client to database and back again.

Today, this scenario is pretty much done with. Any IT shop with exposure to the Web has been forced into a radically new computing infrastructure. Transactions follow a circuitous route consisting of short segment jumps between stand-alone dedicated servers. Typical is a route that goes from Web server to firewall, to encryption server, to app server, to EAI server, to ERP system, to database. Add authentication servers, name servers, XML servers and the like, and the transaction can pass through nearly two dozen stops on its way to completion and finalization in

the database. Such is the nature of distributed computing.

The first and most significant effect of the distributed computing paradigm is that programmers are no longer capable of coding the entire transaction path. Actually, this rather understates the issue. Because the changes to the infrastructure have happened incrementally (first the firewall, then the Web server, then the ERP system and so on) rather than all planned out at one übermeeting of system architects, most programmers do not even *know* the entire transaction path. The person who comes closest to knowing the full path is someone like the network architect.

The ramifications are enormous. Consider the nearly insuperable task of debugging distributed applications. Suppose, for example, that transactions coming in on your Web site are all showing shipping charges of \$0.00. Where do you begin the debugging cycle? In today's environment, this task is daunting because there are no tools available to follow the transaction's complete path. None. Vendor tools will take you along certain segments of the transaction path, but unless you have a completely homogeneous transaction path (everything runs on the same mid-

dleware package, for example), no tool can go end-to-end.

Says a colleague who used to head up technology at Alta Vista's Web site: "We provided stock quotations to our visitors. Every once in a while, the stocks would all show up with a price of zero. Since we received the quotes from a known data feed, we would begin our investigative process where the feed entered our site. Then, at every step where the

data was touched, we would dump it out and examine it—repeating this process until we could locate the offending system. This process was manual, tedious and extremely time-consuming. However, it would have been near impossible had we not known exactly what the data path for the quotes was. Effectively, without knowledge of the data path, this exercise would have been like looking for the proverbial needle in a haystack."

The only company I am aware of that is working on tools in this area is Etnus LLC ([www.etnus.com](http://www.etnus.com)), which has offered the TotalView debugger for several years. During the past year or so, the company has been actively developing new technology to be able to follow transactions across different protocols and systems. The Etnus tool is not aimed specifically at developers, but at anyone at the enterprise level (such as system managers and the like) who need to know the full transaction path.

### MIDDLEWARE WATCH



ANDREW  
BINSTOCK

The second impact of distributed computing on tools is the escalating complexity of development tools. Take Borland's C++ Builder. Like Microsoft's Visual C++, it devours no less than 250MB of disk and in many configurations considerably more. The IDE provides so many complex options that it assumes you will generate your makefiles through its automatic processes. As John Ray Thomas, C++ Builder's product manager states, "This is how most of our customers want makefiles to be written." And I believe him. Configuring command lines by hand would be lunacy on most projects.

But C++ Builder 4 makes it difficult, though, to write even a mere "Hello, World!" program with its (presumably) simple makefile. In fact, the manuals contain no information on which libraries to link in. Only the online help system does, and then only if you search specifically under "RTL." This is the only place. Thomas points out that C++ Builder 5 acknowledges this difficulty and provides improved makefile tools for simple C programs in its project wizard. Nonetheless, the fact that developer-written makefiles and knowledge of the transaction path are not close to the norm anymore are indicative of how far down the path of complexity software development has gone to accommodate distributed computing. ■

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## LET MY DATA GO

"Information wants to be free." As near as anyone can tell, it was Whole Earth Catalog publisher Stewart Brand who said it first, speaking at the first annual Hackers' Conference in 1984. The slogan proved catchy. It was quickly adopted by hackers at the MIT Media Lab, by Free Software Foundation founder Richard Stallman and by thousands of free-software hackers.

There was nothing new in the sentiment, of course. As early as the 1950s, members of MIT's Tech Model Railroad Club, itself one of the legendary birthplaces of hacker culture, reportedly coined a prescriptive slogan—"Information should be free"—to express their support of open standards in model railroading.

As slogans go, "Information wants to be free" is first-rate. It's inspirational. It teases, almost but not quite promising to repay contemplation with deep insights. It includes "free," a buzzword that it shares with the free software community, the First Amendment and miscellaneous political movements. It's short and easy to remember.

### THE SLIPPERY NOTION OF OWNERSHIP

But it doesn't matter what information *wants* to be, really. The information

that belongs to you, or to me, cannot be liberated without our permission. Businesses and individuals hold broad, legally protected rights to the information they create or collect.

Free-information idealism aside, that protection is just as it should be. Your customer database, packed with buying histories and contact data, is a key asset of your business. The documents and source-code files you create embody the unique value you offer customers. In fact, your business's entire value may be captured in data files describing processes, procedures and data. And you own all of that, right?

Maybe yes, maybe no. While no one is seriously challenging ownership of data, your right to use it as you wish—to use it *freely*, in the free-as-in-speech sense—is under direct and immediate attack.

Check out the license terms on the commercial software you use to run your business. You will likely find a clause, buried in the boilerplate, prohibiting you from reverse-engineering both the software that encodes your data and the data files themselves.

You've probably never given those clauses a second thought. I've ignored

similar clauses countless times over the years. When a circulation database failed to provide a report I wanted for a publishing company I owned a few years ago, I figured out the database format and wrote a quick program to generate my own reports. Technically, I was violating the software license. But every byte in the database belonged to me, and I felt I had an obvious right to explore and process it as necessary to run my business.

That obvious right is now under attack. The federal government's proposed Uniform Computer Information Transactions Act would make shrink-wrap software licenses legally binding and give software publishers broad rights to enforce them. Under the UCITA—currently the law of the land in Virginia and Maryland, and under consideration in state legislatures across the country—

software publishers can prohibit the creators of data from enjoying the full rights of ownership of that data.

For instance, the software publisher could publish a revision and require licensees—that's you and me, the users of the software—to pay a fee to upgrade, and convert our data to the new format. Under the UCITA, the publisher could disable out-of-date versions of the software. We would still own the data, but unless we upgraded, our access software

would stop working and we would be legally prohibited from writing new software to read that data.

You see how it works. Any software publisher can hold our data hostage, forcing us to pay upgrade fees, annual maintenance agreements and service charges in order to enjoy continued use of our own painstakingly gathered information. The software publisher can require us to upgrade as often as the publisher requires in order to meet its cash-flow and profitability targets.

You own the data. So what? The publisher owns the data format and the sole right to read, write and convert any information stored in that format.

The UCITA is bad law, but the states do not seem to understand just how bad it is. It, or something like it, is almost certain to become the law of the land in all 50 states.

The solution, of course, is to entrust your business's vital data only to applications whose encoding and decoding methods are a matter of public record, unhampered by troublesome shrink-wrap licenses. Open-source software. It's the one way to ensure that your data really belongs to you. ■

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### OPEN SOURCE



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## XP: NOT JUST ANOTHER PRETTY PANE

With the amount of code flowing forth from the recesses of Redmond these past few months, one is almost tempted to ask, "What's another version of Windows more or less?" Naturally, I refer to Windows XP, the second beta of which reached this grubby journalist's hands a few weeks ago.

Originally, I was utterly exhilarated upon hearing of Windows XP's imminent beta release. But that's when I mistook it for Win64 rather than just another Win32 operating system. In fact, while Windows XP lays some groundwork for the eventual deployment of Win64 and its nigh-mythical benefits, it is just another rung on the consolidation of the Windows 9x/Me and Windows NT/2000 code bases. When I realized that, I almost didn't want to bother with a beta evaluation. Why put up with another interim step, when Microsoft keeps promising a leap forward in evolution. But upon grumpily digging into the beta, I quickly realized that this latest operating-system upgrade may actually represent more of that much-awaited leap than Windows 2000 did.

Remember that little Gatesian tidbit about three or four years ago, when Microsoft actually came out and said it wanted to do away with two separate operating systems and move to a single operating system across both home and

business markets? Then it came out with Windows 98, then Windows 2000, then Windows Me, and most of us just seemed to forget about the impending unification, chalking it up to more hot air from the sunny Northwest.

Well, Microsoft didn't forget about its plans, and Windows XP is proof. If you're running a Windows 98/Me or Windows NT/2000 system, you'll be directly upgradable to Windows XP (unlike 2000 and Me, which still required a user alliance with either the 9x or NT camps). That means XP is an important step not only for users, but for developers. As you may ask, how can XP unify two operating systems like 9x and NT and maintain application compatibility? As with many answers out of Microsoft these days, it begins with XML.

To be really successful at Windows XP application development, Microsoft is urging ISVs to adopt what it calls a side-by-side component-sharing strategy. What this boils down to is that Windows XP will contain support for multiple application resource types—even if these would normally conflict with one another. Windows will simply install competing DLLs in different directories to keep them from one another's throats. Weird,

but true. Even more weird, in initial beta 2 testing, I found this operating system to be at least as reliable as Windows 2000.

A Windows XP-compliant isolated application will now have an associated XML file, called a "manifest," which describes the application to the operating system. That means that all pertinent information, like COM/COM+ class requirements, bindings, interfaces, meta-data definitions and more are now stored within the application (technically, in a unique file associated with the application), not in a single gigantic registry. Using this information, an isolated application will be automatically routed to the appropriate system resource by Windows XP—hence its ability to run a much larger independent application library than either Windows 9x or Windows NT can do separately. Naturally, this strategy isn't all-encompassing, but it does mean a real step forward for Microsoft.

Side-by-side sharing also introduces the concept of side-by-side assemblies, which are really just building blocks for applications. Assemblies encompass ground-floor functionality such as bindings, configurations and versions. Similar to isolated versus open applications, developers can build private or shared assemblies with the former being visible only to a specific application, while the latter is available for use by multiple apps.

The beauty part of an isolated application is that developers are no longer held hostage to either application updates from competing or related applications or, worse, those highly inconsistent system patches dealt out by Microsoft to fix operating-system bugs and other system patch bugs. With side-by-side components, your application will always have its core DLL resources available, so you can decide when it's time to issue an upgrade to another DLL resource rather than Microsoft.

There's quite a bit more to whet a developer's appetite for Windows XP, but I found its support for side-by-side components to be the most compelling. I don't think it spells much good news on the system-resources front—more money for Intel, hard disk and RAM manufacturers—but it's a start.

Other interesting news to developers is that XP also supports GDI+, which is a .NET initiative to improve Windows graphics support. In addition, Windows XP is supposed to be built from a single source tree covering both Win32 and Win64, which means it may eventually become the transitional platform for those struggling from 32 bits to 64. Now if only Intel can get that Itanium out of the basement, we could make some real strides. ■

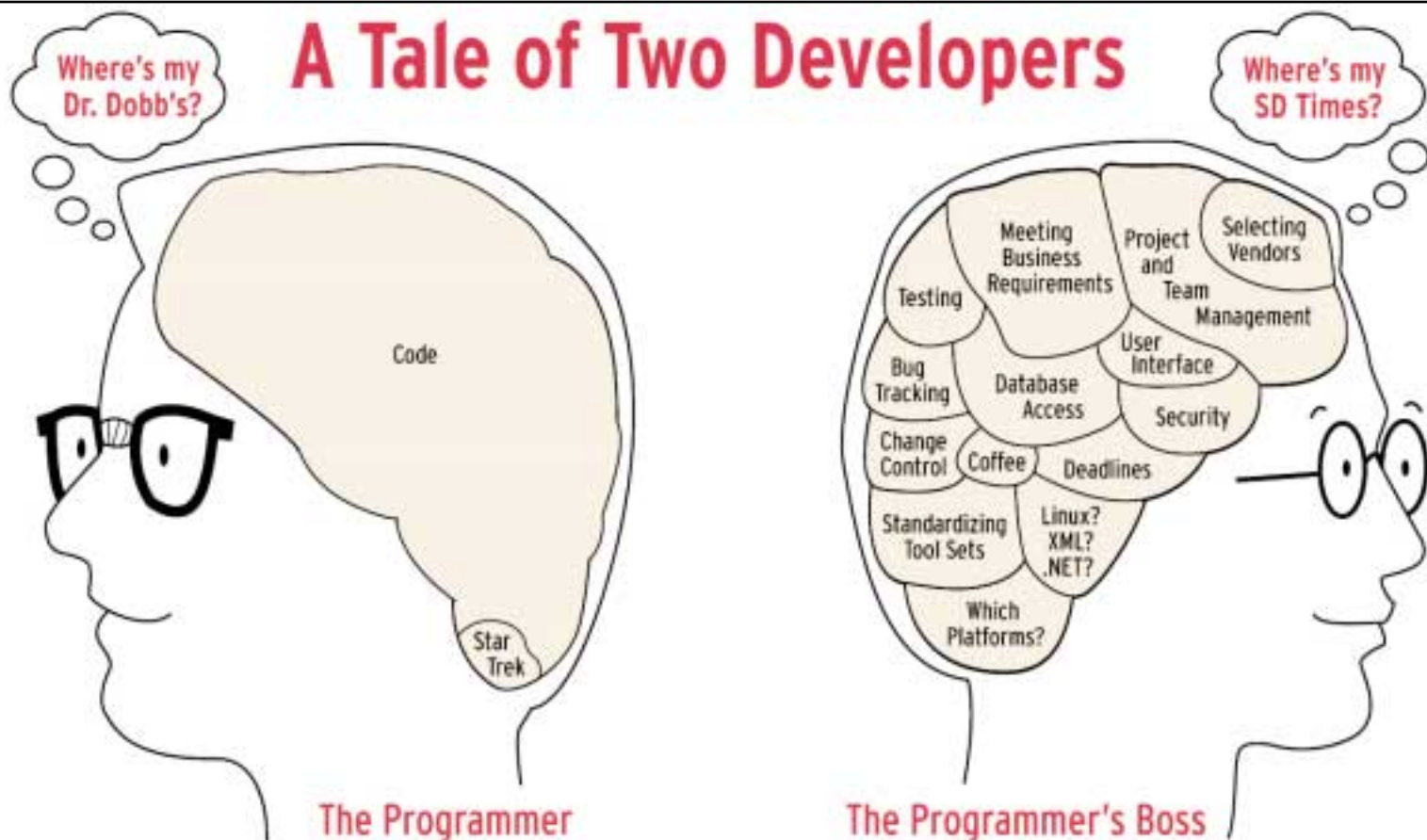
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### WINDOWS WATCH



OLIVER RIST

## A Tale of Two Developers



The Programmer

The Programmer's Boss

## MERELY THE FUTURE OF BUSINESS

"There is nothing magic about Web services." And, "Web services will change the world."

These are the professional opinions of Steve Benfield, the director of the e-business strategy group at SilverStream Software Inc., which this week is releasing SilverStream Extend, an integrated service environment for repurposing existing back-end applications as Web services through the use of XML and other Web services specifications.

One important specification—ebXML—was demonstrated in proof-of-concept at the recent XML DevCon event in New York. About a half-dozen companies playing the role of buyer and seller showed

how the emerging standard can be used to do business over the Web. It was little more than one company sending a message to a second, which acknowledged receipt of the first message. There was a bit about partner discovery through a collaboration protocol profile and then acceptance of a collaboration protocol agreement—described by ebXML working group chair Sid Askary in this way: "CPP is what you can do, and CPA is what you're willing to do with your partner." This brings us to the first of Benfield's quotes: "There is nothing magic about Web services."

The client/server computing paradigm changed business processes by bringing intelligence and power to the desktop via network PCs. Now we have network businesses. Unfortunately, at this point in time, most interbusiness activity is proprietary; the work being done on business exchanges is not reusable between exchanges if they are not standards-based. And while there may ultimately be more than one stan-

dard for business-to-business activity, that's all right as long as there are mechanisms for communication among the various standards.

Peter Treese is a member of the Technology Computing Consortium division at Monsanto Corp. He watched the ebXML demonstration and wondered, "Can these guys get together and go to an industry and prove they can solve a problem?" If XML is so basic to organizations, he asked, why can't they even agree on something so simple as a protocol for communications and exchange? Some companies have embraced ebXML as the B-to-B foundation; others are building on WSDL and UDDI.

Treese tried to relate the development of these Web services specifications to traditional software development. "The specification drives the product—that's normal development," he said. "When it's reversed, it may miss the market. Then all you're doing is trying to look for a market. You have to define the requirement, then produce the software." As for the Simple Object Access Protocol, or SOAP—which has been embraced by the ebXML consortium—Treese said, "the industry needs a spec that's a little more robust. [SOAP] doesn't have the level of security necessary for a company to expose its services across a firewall."

Tim Bray, one of the initial developers of XML, observed that the reason for different standards is that "vendors have proprietary axes to grind. There are a lot of agendas on the table, and not everyone is playing in good faith." Bray said the process of achieving total interoperability will be "slow, painful and ugly." On the upside, Bray said he believes there never will be solo-player domi-

nance on the server side as there had been on the desktop. "For the first time, Microsoft is taking the position that for customers to succeed, they'll have to have interaction with non-Microsoft products," smiled Bray. "How can that not be good?"

SilverStream's Benfield admits there is much hype surrounding Web services, and that it will take businesses "a long time to get there" because the standards must be finalized and the tools must be made readily available to all businesses wishing to utilize them. SilverStream's Extend, he said, can make the transition to Web services happen faster because it incorporates three existing products: xCommerce, an integration server that uses SOAP to bring mainframe applications to the Web; SilverStream's portal, for coordinating and accessing applications and business processes; and its J2EE-compliant application server for the assembly and deployment of dynamic workflows. Extend also provides the tools for building portals and JSPs as well as front ends that go to any device and deliver, with the use of a personalization engine, data in a relevant way.

SilverStream is just the latest retooled application server vendor to cast its lot upon the sea change of Web services. BEA, HP Bluestone and IBM all have announced enthusiastic support for Web services and have numerous products in various stages of development to make Web services a reality. When that happens—when businesses can find each other programmatically over the Internet, negotiate agreements, create loosely coupled partnerships and conclude transactions—we come to the second of Benfield's quotes: "Web services will change the world." ■

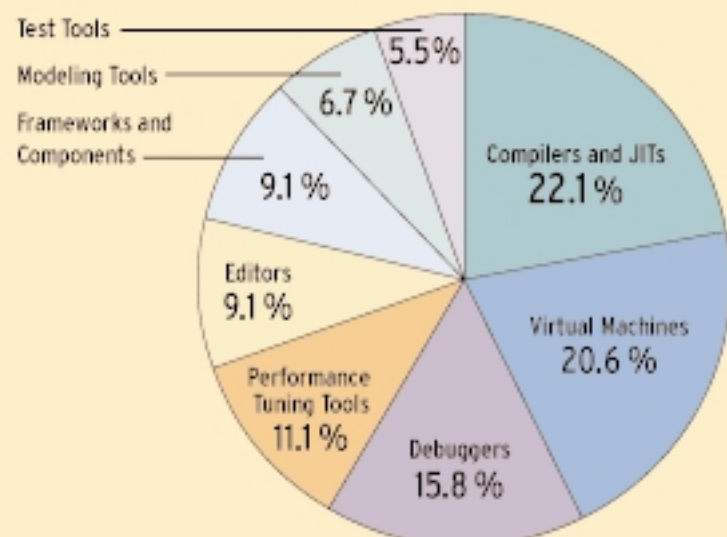
David Rubinstein is executive editor of SD Times.

### MONEY WATCH



DAVID RUBINSTEIN

### Which Type of Java Tool for Linux Needs the Most Improvement?



Existing compilers and JITs for Java are the tools that need the most improvement, according to a recent survey of 303 Linux developers. More than 22 percent of those surveyed said tool makers should work on those products.

Next on the list of Java tools for Linux in need of improvement, according to the survey, were virtual machines, with just more than 20 percent of respondents indicating work is needed in that area.

Test tools were the tools least in need of improvement, with only 5.5 percent of respondents indicating problems.

Source: Linux Developer Survey, Spring 2001  
www.evansdata.com



### CALENDAR OF EVENTS

#### Spring Enterprise Linux Implementation Conference

May 13-17  
Doubletree Hotel, San Jose, CA  
101 COMMUNICATIONS LLC  
[www.elxi.com](http://www.elxi.com)

#### Applied Computing Conference & Expo

May 14-17  
Santa Clara Convention Center, CA  
ANNA TECHNOLOGY INC.  
[www.ac-conference.com](http://www.ac-conference.com)

#### XML One

May 14-17  
Hyatt Regency McCormick Place  
Chicago, IL  
101 COMMUNICATIONS LLC  
[www.xmlconference.com/chicago](http://www.xmlconference.com/chicago)

#### STAR East

May 14-18  
Rosen Centre Hotel, Orlando, FL  
SOFTWARE QUALITY ENGINEERING  
[www.sqe.com/stareast](http://www.sqe.com/stareast)

#### Worldwide Developers Conference

May 21-25  
San Jose Convention Center, CA  
APPLE COMPUTER INC.  
<http://developer.apple.com/wwdc2001>

#### Spring Presence and Instant Messaging

May 22-24  
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#### Enterprise Web & Portal Conference & Expo

May 23-24  
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INTERMEDIA GROUP INC.  
[www.intmedgrp.com/eweb](http://www.intmedgrp.com/eweb)

#### Wireless One Conference & Expo

May 29-June 1  
New York Hilton, NY  
INTERMEDIA GROUP  
[www.imgevents.com/wireless](http://www.imgevents.com/wireless)

#### Strategic IT Staffing Conference & Expo

May 30-31  
New York Hilton, NY  
INTERMEDIA GROUP INC.  
[www.intmedgrp.com/sitss/sits01ch/overview.html](http://www.intmedgrp.com/sitss/sits01ch/overview.html)

#### Convergence University

May 30-June 1  
Mission College, Santa Clara, CA  
CONVERGENCE PROMOTIONS  
[www.convergenceu.com](http://www.convergenceu.com)

#### JavaOne

June 4-8  
Moscone Convention Center, San Francisco, CA  
SUN MICROSYSTEMS INC.  
<http://servlet.java.sun.com/javaone>

#### UML World

June 11-14  
Crowne Plaza Hotel, New York, NY  
CMP MEDIA INC.  
[www.umlworld.com](http://www.umlworld.com)

#### eBusiness Conference and Expo

June 12-14  
San Jose Convention Center, CA  
CMP MEDIA INC.  
[www.kingbird.com/ebusiness](http://www.kingbird.com/ebusiness)

#### VBITS (VSLive!)

June 20-23  
New York Marriott Marquis, NY  
FAWCETTE TECHNICAL PUBLICATIONS  
[www.vbits.net/2001/ny](http://www.vbits.net/2001/ny)

#### Technology Exchange Week (PC Expo)

June 25-29  
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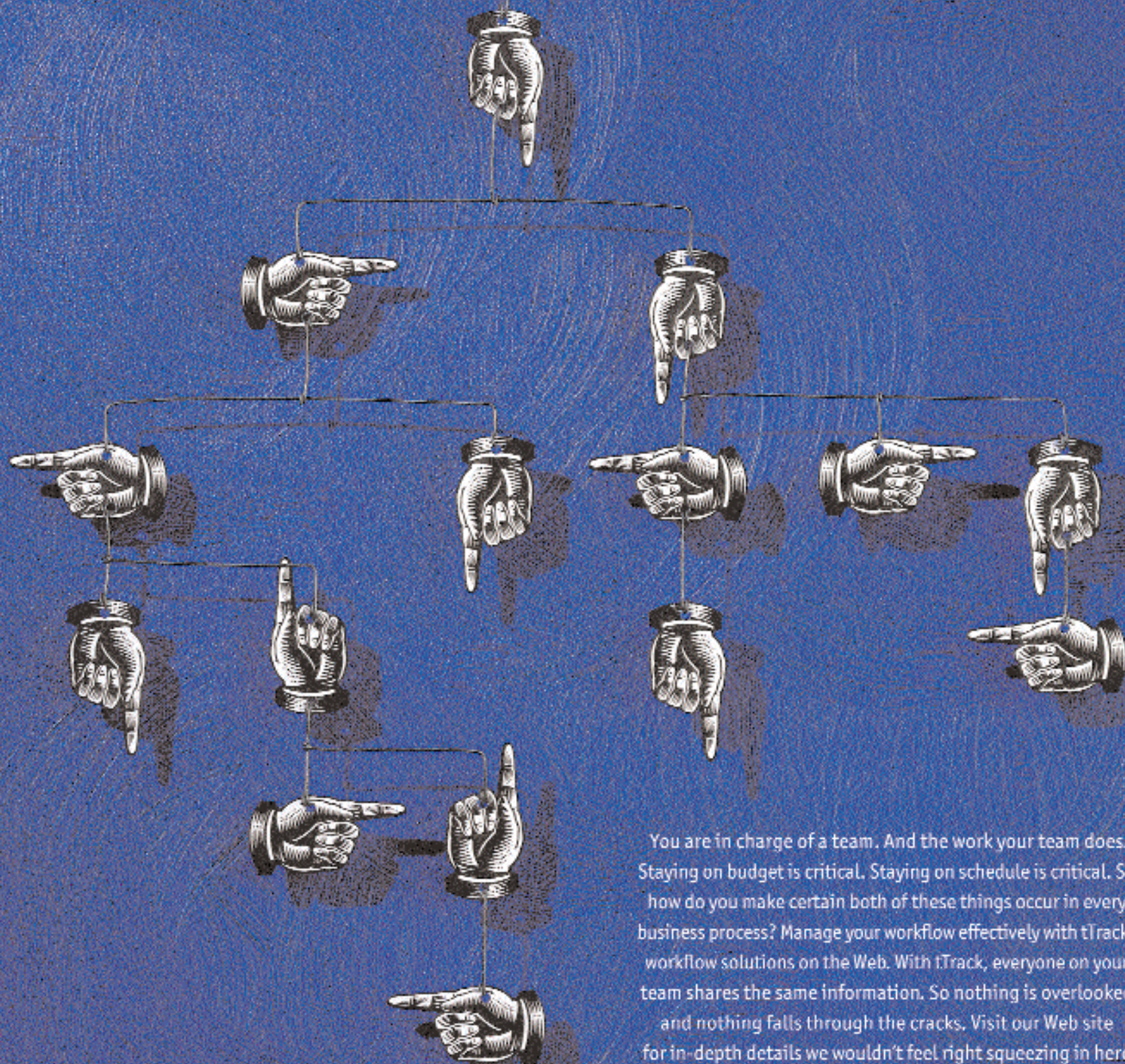
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